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...Table of Contents...

PAGE

ORIGINAL ARTICLES.

Canine Distemper, by H. B. Felton . . . 529
Homeopathy in Veterinary Practice, by J. Helmer 537
Inaugural Address before New York State Veterinary College, by Professor Jas. Law 548
Bovine Diphtheria, by J. F. Winchester, 561
Hereditary Influence, by W. H. Lowe . 573
Tumors of the Brain and Cranial Cavity, by A. Labat 576
Pathogenesis of Sidebones, by X. Lesbre, 584

PAGE

ABSTRACTS.

Trainers and Horseshoers—Rinderpest in South Africa—Constipation in Elephants—Birth of a Living Fetus on the Two Hundred and Twenty-first Day of Gestation—The Value of Tetanus Antitoxin — Tubercles of Glanders—Elongation of the Hind Members Due to Castration—Bungling Examination of Dairy Cows—Antiophthalmic Ointment 585-591

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THE
VETERINARY MAGAZINE.

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CANINE DISTEMPER.*

BY HOWARD B. FELTON. B. S., V. M. D.
Philadelphia, Pa.

Canine Distemper is a disease that can be traced back to a very early period. Virgil writes of it in his "Georgics," and there is no doubt that if the records had been properly kept, we would find that Neolithic Man was acquainted with this disorder that gave his dog the running nose and weeping eyes, and was aware that the proper treatment was a supernasal application of the pitchy products of the conifera. We find it described in the hunting books of the Middle Ages. Hewitt, an English author, was the first to recognize its contagious nature, which was afterwards demonstrated by Karle, Trasbot, Venuta, Krajevski and Laosson. Distemper is a disease proper to canines, although it has been observed by Laosson in both domestic and wild cats, and, according to Friedberger and Fröhner, in the fox, wolf, hyena, jackal and monkey. To this list we must add man, as Zelinski, Nenski and Karpinski have recently discovered that distemper can be transmitted from the dog to man, causing in the latter tenonitis or an inflammation of the capsule of Tenon. A full account of this interesting discovery will be found in a translation by Dr. S. J. J. Harger of an article on "The Microbe of Canine Distemper" in the "Veterinary Magazine" for June 1895, to which article we acknowledge our indebtedness in speaking of the specific origin of the disease. Distemper has been claimed by some authors to be variola in

* Read before the Pennsylvania State Veterinary Medical Association.—Reading Pa., October 6, 1896.

the dog. By various others it has been spoken of as typhoid fever, typhus fever, scarlatina. While there are points of resemblance to all these diseases, it has been found after a careful study and comparison to be the most closely allied to measles. Both diseases affect young animals; each is ushered in by malaise, anorexia and chills. In each we have catarrh of the nasal and conjunctival mucous membrane, respiratory troubles, cutaneous eruptions and lesions of the nervous system. While the resemblance is remarkably close however, we find in distemper lesions of the digestive tract which differentiate it from measles and assimiliate it to typhoid fever, so that taken as a whole it must be regarded as a disease *sui generis*. As to the specific agent in the causation of distemper much has been done in the line of original investigation and research. Semmer in 1875 found in the blood and lungs of a dog, which had died of distemper, a micrococcus, and in the blood, lungs, liver, spleen and kidneys a short, small bacillus. He considered the bacillus to be the specific agent. Laosson continued the researches of Semmer, and cultivated the micrococcus and bacillus in bouillon from the dog, and with these mixed cultures, was successful in reproducing the disease. In 1891 Schantyr arrived at the conclusion that the micrococcus heretofore described was only a pyogenic micrococcus.

From his opinion he distinguished (1) a disease of young dogs determined by a small bacillus 1 to 2 mm. in length, grouped, found in the spleen, blood, the liquid exudates and liquefying gelatin; cultures upon serum transmitted the disease; (2) an abdominal typhus caused by a bacillus .7 to 2.0 mm. long, which did not stain with Gram's method; (3) a typhoid affection due to a bacillus shorter than the preceding, which does not stain with the above method. From 1892 to 1894 Zielinski, Necki and Karpinski made a series of observations and discovered in the discharges from the nose and eyes of dogs affected with distemper a micrococcus which was capable of producing in man an inflammation of the capsule of tenon, and in some cases a diffuse bronchitis and pneumonia. This micrococcus is immobile and measures 8 mm. It can be grown upon bouillon and upon gelatin at 37°C. It is analogous to the streptococcus pyogenis albus, but it decomposes sugar and peptonized albumin. Since 1893 Galli Valerio, from the pathologic institute of the Veterinary School of

Milan, has made a bacteriologic study of this disease and claims to be the first to have discovered a bacillus in the lungs and central nervous system, inoculations of the cultures from which have produced all the symptoms of distemper. He deduces the following conclusions : (1) In distemper there is found in the lungs and the central nervous system a bacillus whose dimensions vary from 1.25 to 2.5 mm. in length and .31 mm. in diameter, (2) This microbe gives characteristic cultures in gelatin at 18 to 20°C. (3) The inoculation of these cultures into the veins, under the skin, and into the lungs of aged dogs, does not reproduce the symptoms of distemper. (4) The inoculation of a culture obtained from the brain under the skin of a dog five to six months old has reproduced the disease, with its characteristic pulmonary and cerebro-spinal symptoms. It would seem from a review of all these experiments that more than one organism is concerned in the production of this disease, with all its train of complex symptoms. Distemper usually appears at an early period in the dog's life ; in most cases at the time of dentition. It may appear, however, at any age, the extreme limit we have observed being twelve years. The younger the dog the more fatal the disease is supposed to be, but an exception must be made in the case of extremely young dogs, as we have observed in the case of suckling puppies that have contracted the disease from the mother, that they almost invariably have it in a mild form and free from complications. The contagion is extremely volatile and may be communicated by direct contact of the animals with each other, by fromities, by an attendant or by the air. Semmer relates a remarkable case where the disease was conveyed to two puppies from the carcass of an animal which had been left in the cold for fourteen days prior to an examination. The period of incubation is from three to five days, shorter in summer than in winter. In cases free from complications, this is followed by a slight fever, dullness and loss of appetite, which lasts for about four days, the temperature rarely rising above 103°F. At the end of this time the eruption comes out, usually upon the soft parts of the skin, and in most cases only in the inguinal region. This eruption may pass through the various stages of erythema, vesicle, pustule and ulcer, although it is frequently seen simply as an erythema, and sometimes only in the form of a vesicle. The

eruption does not penetrate the deeper layers of the skin, as we see in variola in the horse and sheep, but is entirely superficial. When the eruption comes out the fever drops, the appetite returns and the vesicles scale off in about two days. Then comes a secondary eruption, which scales off in two days and disappears. There is then a period of convalescence which lasts for about six days, so that the whole attack, if uncomplicated, will last about eighteen days. In highly-bred dogs the first fever may be very high and we may have death occurring, due to repercussion, the eruption appearing internally as an intense congestion of the respiratory tract or of the intestinal tract, causing fatal gastro-enteritis. Death may also occur from irritation produced by the pustules. One attack usually conveys immunity, although some dogs will contract the disease a second time, and we have observed one case in which a dog had three separate attacks during a period of four months.

The complications may be divided approximately into three classes. 1. Respiratory. 2. Intestinal. 3. Cerebro-spinal. Respiratory troubles are usually ushered in by a coryza which may disappear in a few days, but in most cases it is followed by congestion of the lungs and broncho-pneumonia, which is indicated by an increase of fever, alternating with chills, respirations greatly accelerated and in severe cases flapping of the lips during expiration. On auscultation mucous and sibilant rales can be detected. The animal emaciates rapidly and refuses all food. The discharges from the nose and eyes become mucopurulent. When the nasal discharges become mixed with blood it usually indicates the breaking down of a large portion of the lung tissue and points to a fatal result. The eyes may be affected with a conjunctivitis which may terminate as such, or may be followed by a simple keratitis which may result in ulcerative keratitis. The intestinal complications may be enumerated as gastritis, gastro-duodenitis, jaundice and enteritis. Gastritis is indicated by the inability of the stomach to retain food, and persistent vomiting of a frothy mucus which soon becomes mixed with bile. In gastro-duodenitis the matter vomited does not contain bile, but consists of glairy mucus. Gastro-duodenitis usually ends in enteritis, and frequently, from extension of inflammation of the bile ducts, in jaundice. Jaundice is almost invariably a fatal complication. We have observed that in distemper enteritis very often assumes a sub-

acute form, so far as the manifestation of pain is concerned, although the organs after death may show the signs of intense inflammation. This is no doubt due to the toxic influence of the poison in the blood. There is observed in enteritis first an obstinate constipation, followed by a serious diarrhea rapidly becoming dark in color and mixed with blood. The discharges have a peculiar fetor, which is very characteristic. Dysentery frequently sets in, and in a few days the animal becomes greatly emaciated, foul-smelling and a pitiable looking object indeed. The discharges are passed frequently in very small quantities, often accompanied by tenesmus, which is liable to cause prolapse of the rectum. We have found prolapse of the rectum under these circumstances not to be amenable to treatment. Under the head of cerebro-spinal complications may be mentioned meningitis, myelitis and chorea. Meningitis usually manifests itself in the form of epileptic fits, in which we have pivoting of the eyes, frothing at the mouth and champing of the jaws—animal may throw itself upon its back and utter shrill cries or moans. Meningitis may be exhibited in that rarer form in which the animal walks around continuously in a circle in one direction, either to the right or the left, and appears to be in a sort of stupor, showing indications of brain pressure. A series of fits in rapid succession may be considered as indicating a fatal result, while one or two, especially if occurring early in the course of the disease, do not have a grave signification. We may look for fits in finely-bred dogs and those of a highly nervous organization.

Myelitis is indicated by a gradually progressing paraplegia, which in most cases is accompanied by anesthesia of the parts affected. The paralysis usually precedes the fatal result, or if the animal recovers there will be in most cases an imperfect use of the hind limbs. Chorea is a clonic spasm of the voluntary muscles, and may be general or local. It may come on at the end of the period of eruption, or may appear as a sequel some weeks after recovery. The muscular twitching is more marked when the animal is in a state of repose. Associated with it we very often have a high degree of nervous irritability, and the animal cries persistently as if in great pain, sometimes even in his sleep. In other cases the animal remains in good spirits and has an excellent appetite. The general form has been described as a paralysis agitans, and is not amenable to treatment.

The constant motion wears the animal out, the muscles atrophy, the animal becomes a miserable skeleton and succumbs to exhaustion. Some local forms, where one set of muscles only, or one side of the body is affected, yield to treatment. In others, while the general health may be restored, the muscular twitching persists during life. In rare cases we will observe nervous phenomena simulating locomotor ataxia, in which there is a loss of co-ordination in the movement of the limbs, a staggering, precipitate gait, the legs starting hither and thither in a very peculiar manner, and the feet coming down with a stamp at each step. This condition is due to a diseased area affecting the posterior columns of the spinal cord and the posterior nerve roots. As in the human subject, the use of the eyesight is necessary to prevent the animal from falling. We have not noticed, however, strabismus, ptosis or neuralgic pains, which are characteristic of this disease in human beings.

A rare complication of distemper is lymphadenitis, which we have observed affecting the sub-maxillary lymphatic glands, the glands on the side of the face, and in two cases the thyroid glands, forming abscesses with considerable sloughing of tissue and being very slow to heal. A rare sequel which we have observed, and have not seen mentioned before, is purpura hemorrhagica, a well-marked case occurring in a spaniel puppy four months old, one month after recovery from a mild attack of distemper. The alterations are essentially those of a fever, the muscles being of a pale-yellow color, with little red ecchymotic spots throughout their substance and the fat burned into little masses of gelatin. The blood is fluid and watery. In enteritis we find ulceration and infiltration of the intestines, especially of Peyer's Patches and the solitary glands. In broncho-pneumonia we have congestion of the lungs, bronchi filled with frothy mucus, V-shaped areas of lobular pneumonia and possibly presence of abscesses in lung substance. In chorea and myelitis we have infiltration of round lymphoid cells into the spinal cord, medulla oblongata and cerebellum, and granular degeneration of the nerve cells.

Treatment.—The treatment is essentially symptomatic. Many cases require no treatment but good hygienic surroundings and careful feeding. There is no disease where careful nursing is more urgently required. The eyes need frequent cleansing to prevent ulceration. The bowels need to be

carefully looked after to prevent enteritis. The animal must be kept from drafts to prevent pneumonia, and if a nervous subject must be treated very gently to avoid fits. While these complications may occur despite the best of care, yet the possibility of preventing them should cause us not to relax our vigilance. For conjunctivitis we bathe the eyes frequently with hot water and apply a solution of boric acid, ten grains to the ounce. For a simple keratitis we use thrice daily a collyrium containing one-quarter grain atropia and two grains sulphate of zinc to the ounce. We have never found it necessary to use a stronger solution than this. When ulceration of the cornea sets in we use in addition to the collyrium above mentioned dry oxide of zinc, dusted upon the ulcers, being sure to have the powder free from grit and ground very fine. Our method is first to use the collyrium and then the powder. In some cases we have had good results from the use of honey in addition to the other remedies, applying two drops in the eye morning and evening. When the cornea has ruptured and the aqueous humor run out, granulations frequently spring out from the seat of the ulcer, which have been called staphyloma. It is often necessary to remove these with the knife, as they are exquisitely tender and cause the animal great pain and discomfort.

Shoemaker's wax upon the nose is not to be despised, but we have found better results from fumigations of tar which seem to exercise a decidedly beneficial action upon the disease, especially upon the bronchial complications. Care must be taken however not to make the fumes too dense, as in this case they prove too irritating. We find quinin to be indispensable in the treatment of distemper. In pneumonia we combine it with muriate of ammonia, giving from one to three grains of each in capsules according to the size of the dog, three or four times daily. We also employ it in the intestinal complications combined with subnitrate of bismuth. We have had good results in pneumonia, especially in cold weather, from the use of a jacket stuffed with cotton batting sewed around the chest and neck, placed on early in the attack, and left on until some time after convalescence. In bad cases of pneumonia we have used 1-120 to 1-80 of a grain of strychnia as a respiratory stimulant with good results. We also give milk punches frequently in small amounts alternating with beef tea when the animal grows tired of them.

In gastritis and in mild forms of diarrhea, we have found salol and subnitrate of bismuth to be a good combination. In cases of persistent vomiting, we give half-drop doses of carbolic acid and iodin every hour, and small doses of egg albumin given frequently alternated with milk and lime water. In bad cases of diarrhea, when the discharges are tinged with blood, and in dysentery, we employ a combination of opium one grain, sulpho-carbolate of zinc one grain, and bismuth subnitrate five grains, also enema of starch water. We have found the best diet in dysentery to be raw meat slightly broiled in butter, cut up finely and given in small quantities. This is completely digested in the stomach before it reaches the inflamed bowel. We do not use purgatives, but employ olive oil for its laxative, emollient and nutritive qualities. For epileptic fits we employ the hot bath and give mixed doses of pot. bromide and chloral, five grains of each, repeating every three hours and increasing the dose if necessary. Where it is necessary to use this remedy for some time, we substitute bromide of sodium for the potassium salt, as it can be given in larger doses, and is better tolerated by the stomach. In those cases of locomotor ataxia, and those in which the animal travels around in a circle, we have never had any good results from treatment. It would seem in the latter case, that trephining would be indicated if the proper spot could be found.

In chorea we have tried every remedy proposed thus far, and must say that the only good results we have ever obtained have been by the employment of arsenic. We have not obtained the results which M. Monfallet gets by the use of quinin. It may be, however, that the cases which he cured did not have chorea as a result of distemper. It is our opinion and that of a number of physicians with whom we have conversed, that chorea following distemper in the dog, is of a much more intractable kind than that seen in children. We believe it to result largely from the anemic condition of the blood, and the granular degeneration of the nerve cells in this disease indicates that it is a very serious lesion indeed. In arsenic we have the valuable properties of a blood tonic and a special stimulant to the nervous system. We begin with two drops of Fowler's solution thrice daily, increasing one drop every third day, and pushing it up almost to the verge of poisoning, stopping altogether when the animal begins to

vomit, and after two days commencing again with the smallest dose. In some dogs we find an idiosyncrasy against the use of Fowler's solution due to the lavander in its composition, and in these cases we employ the liquor acidum arseniosum, the dose being the same. With this treatment we have cured a fair proportion of cases, but, alas, far too few.

The great trouble in the treatment of chorea is in the length of time it takes to effect a cure, the owner usually becoming disheartened at the slow rate of improvement and ordering the animal destroyed. Many cases will take from three to six months to effect a cure. In others, the twitchings may persist for a year and then disappear. We are anxiously looking for the discovery of an antitoxin which shall be both preventive and curative, and be a much more powerful weapon than any we are able to employ at present in combating this disease.

HOMEOPATHY IN VETERINARY PRACTICE. WHY I DO NOT PRACTICE IT.*

By Jacob Helmer, D. V. S.
Scranton, Pa.

Systems of healing, like those of religion, attract their following by virtues real or imaginary. Attracted by superior virtue, intelligent and honest men have forsaken one form of religious belief for another, or have abandoned a mode of healing which circumscribed their ability and skill. This is right. It shows a spirit of progression. Investigation is the mother of progress.

Articles tending to show the advantages of homeopathy over the regular treatment in medicine and the reports of success with remedies applied according to this system have appeared in our journals as evidence of a progressive tendency on the part of the writers. But the experiments reported have to the extent of their influence tended to array homeopathy against the regular practice; that this was not the motive is

* Read before the Pennsylvania State Veterinary Medical Association. Reading, Pa , October 6 1896.

evident from the diffidence shown, and the acknowledgment of limited experience in this mode of healing. Charlatans have however thus arrayed the two systems and, by dint of assertion and persuasion, have crowded themselves upon the field of veterinary medicine with the object of selling their wares. Compilations of veterinary homeopathic *materia medica* have been issued ostensibly with the same purpose of advertising and selling their wares. Translations of foreign homeopathic veterinary works are offered. Under the law of competition such things are natural. It is called business. But we are the representatives of science in our field. By means of recorded observation we build the substantial edifice of veterinary science. We would not remove a stone from this edifice if we could not replace it with a better one. The question is—Can we to any extent reconstruct this edifice on the principles of homeopathy? My note-book discloses that during a period of two years we treated diseases with the homeopathic and regular methods in order to form an idea of their comparative value. By comparison we see quickly the perfections and imperfections of the things compared.

History shows that the *regular* or *rational* school of medicine has been a development unhampered by any restrictive tenets. Its foundation stones are reason, experiment and experience. Its *aim* has been *truth*. It accepts truth from any quarter. Recognizing disease as an entity it has developed the sciences that include the phenomena of causes, viz., anatomy, physiology, biology, pathology, morbid anatomy and bacteriology. Operating in sympathy with nature's laws it seeks to remove causes. It does not claim to cure disease, but recognizes the healing power of nature. It uses every reasonable means to accomplish results. It stands ready to reject the ideas and methods of yesterday, if it can substitute better ones today. It is progressive. It is not an exclusive system. It has not discovered any universal law of therapeutics. It does not claim to have found any law in nature either of similars or opposites according to which exclusively drugs influence the animal organism. It has witnessed the birth and death of exclusive systems. It need not go outside of itself, in direct disobedience to the principles of any founder, and appropriate the good of all in order to save its very life. It does not owe its success to credulity and superstition. It has been the most

successful. It has not been driven by time and discovery to the humiliating spectacle of modifying and eliminating itself until scarcely anything remains but its flag.

On the threshold of experience with any method of treatment we must first learn its principles, conform to its rules and accept the conditions it imposes upon us. The work announcing and elucidating the principles of homeopathy was published by its founder, Samuel Hahnemann, in 1810. He named it "The Organon of the Healing Art."

On page 103 of the "Organon" he says: (1) "*Similia similibus curantur* (likes are cured by likes) is the only therapeutic law," that is to say, the only salutary treatment is that method according to which a disease is combated by a medicine capable of creating in the healthy body symptoms most similar to those of the disease. (2) "The totality of the symptoms is the only guide to the physician in the administration of remedies;" that is to say, every drug, before it may be properly employed in treating disease, must first have been administered to a person in health, and the symptoms produced thereby recorded in order that their similarity or dissimilarity may be compared with those from which a patient may be suffering for whose relief a drug is sought to be administered. All that the physician may regard as curable in disease consists entirely in the complaints of the patient and the morbid changes in his health perceptible to the senses. (3) "The only true method enabling the physician to select the proper remedies in disease is to prove them upon persons in health." That is to say, every drug before it may be properly employed in treating disease must first have been administered to a person in health and the symptoms produced thereby recorded in order that their similarity or dissimilarity may be compared with those from which a patient may be suffering, for whose relief a drug is sought to be administered.

To be consistent with these principles and to obey this therapeutic law, we must experiment upon the various classes of the lower animals to find what drugs will produce symptoms similar to the symptoms of diseases we desire to cure. But has this been done for veterinary homeopathy, if I may be permitted to use the expression? Some authors on veterinary *materia medica* are silent on this point. One speaks of careful provings having been made, but we have seen no record.

But we know that animals have been utilized by the regular school, as well as the homeopathic, to demonstrate the toxic power of remedies to be used in the treatment of human diseases.

But admitting, for the sake of argument, that careful provings have been made upon different species of the lower animals, the results obtained are meagre, since only the objective symptoms produced by the drug can be noted. But some of the objective symptoms thus noted are unreliable, especially such as relate to the disposition and movement of the animal. Here it requires the discrimination of the prover to determine whether these objective phenomena are the primary result of the drug or are secondary to some influence produced by the drug.

Hence the symptoms which may be considered reliable, obtained by proving drugs upon the lower animals, are those indicated by the pulse, pupil, conjunctiva, the visible mucous membranes, the skin and the excrements of the body. But the therapeutic laws of Hahnemann demand all possible symptoms obtainable from the action of a drug, on every organ and tissue of the body. The subjective symptoms are therefore indispensable, in a system in which symptoms are everything and morbid conditions and causes are nothing. "They fancied," says Hahnemann, "they could find the cause of disease, but they did not find it because it is unrecognizable and not to be found, since by far the greater number of diseases are of a dynamic (spirit like) origin and nature ; their cause therefore remains unrecognizable."

Observe that in the second part of the law quoted from the Organon, it declares that the totality of the symptoms is the only guide to the physician in the administration of remedies. To meet this ever-varying totality of symptoms and to find their correspondences, it has been found necessary to conduct extensive provings. The homeopathic encyclopedia of pure *materia medica* is an evidence. It consists of ten large octavo volumes of about 700 pages each ; but if only the objective symptoms of the proven drugs were necessary to establish the system of homeopathy, such extensive provings would not have been made. The *subjective* symptoms have been considered indispensable both to better fulfill the law of *similia* and to find remedies that will do better work.

But limitation to the intelligent and successful practice of veterinary medicine may be shown in another way, and this directly attacks the integrity of the therapeutic law upon which homeopathy is based. In my experience the infinitesimal dose does not appreciably affect animals either in health or disease, but doses large enough to cause appreciable symptoms in the puise, pupil, muscles and mucous membranes, if administered in a disease characterized by the same or similar symptoms, will intensify those symptoms instead of relieving them. This you have observed in the use of belladonna, aconite, nux vomica, etc. Therefore the law of *similia similibus curantur* practically followed, as we must follow it in veterinary practice, becomes null and void.

A consideration of the breadth and scope of the rational system applied to the practice of veterinary medicine, when compared with the limitations naturally imposed upon the homeopathic system when it deals with the maladies of the lower animals, ought to weigh in favor of the former method, and unless it can be shown that success is more common and certain in homeopathy, ought of itself alone to deter one from adopting a circumscribed method.

Homeopathy in veterinary practice, finally, means to become a merely routine practitioner. To rely for success upon a supposed specific judgment, discrimination and skill can only be exercised in the selection of the remedy. Symptoms are everything. Causes and morbid conditions are nothing. It is not necessary to know the nature of a remedy, how it acts, or upon what it acts. If its symptoms correspond to those of the disease the physician has done his work well. This reduces the practice of medicine to a simplicity.

Homeopathic remedies consist practically of tinctures and triturates. The tinctures are about the same strength as those of the U. S. P. The metallic and insoluble remedies are prepared in milk sugar, and dispensed in this form. The strength of a remedy is its dilution or potency. To produce a uniform series of dilutions, a scale was introduced by Hahnemann, called the centesimal scale. According to this scale one part of the mother tincture or powder is mixed with ninety-nine parts of alcohol or milk sugar. This forms the first dilution or potency. One part of this dilution in ninety-nine parts of alcohol the second dilution. The principle is that the first

potency must contain 1-100 part of the strength of the remedy, and the succeeding potencies each 1-100 part of the preceding one.

But more recently another scale has been introduced—the decimal scale. By this scale one part of tincture is diluted with nine parts of alcohol, and similarly with the powders, one part in nine of milk sugar to form the first potency. In respect to the size of the dose authorities vary; some recommend the higher potencies, those above the thirtieth. Others the thirtieth potency. Others the third dilution of tincture and the sixth of insoluble remedies.

But an exception is made of carbolic acid, aconite, rhus tox., bryonia and others, which may be used in the first or even in the form of the mother tincture. In applying homeopathy with the object of testing its value in treating the diseases of the lower animals it is necessary to form at least two classes, these are the acute critical and the acute non-critical. Of acute non-critical cases one-half were treated with homeopathy and the remainder with no medicine. In non-critical cases of pneumonia treated with high or low dilutions, or with no medicine, I could find no substantial difference. The cases ran the course marked by various changes in each case according to the natural history of the disease and the age, temperament and vitality of the patient. There were differences, but it was not reasonable to refer them to anything besides natural causes. There was no noticeable effect of the remedy upon the pulse, respiration and temperature. Practically, in horses I found no difference between the first or third or thirtieth potencies in non-critical cases of pneumonia. In acute non-critical cases of disease in the horse of whatsoever nature the experience was the same. The hygiene and diet was made the best possible. The superiority of the regular treatment was established in its power to abort colds and incipient diseases of the respiratory tract. In some acute critical cases nature seems powerless, when rational treatment may and does save life. Rational after-treatment lessens the convalescing period and prevents relapses. I had no success with homeopathy in cases of toxic poisoning, in cases where pain was an element to subdue, in impaction of the bowels, anemia, vitulary fever in cattle, azoturea, colic, chorea, diabetes insipidus, laminitis, tetanus, purpura, rheumatism and collapse. I do not mean that cases so treated did not

recover, but cases treated *placebo* recovered. But the action of the remedy could not be traced; no desired effect could be produced. My tools were not tools. Acute critical cases will do better without medicine, unless such treatment be intelligent and not a hindrance to nature. Regular treatment not intelligently used is worse than no treatment. Here homeopathy may win a few laurels and somebody think he have made a valuable discovery. An unsuccessful regular practitioner in using drugs to alleviate disease, can become a successful homeopathist. Nature's tendency to heal must be fully recognized. In cases in which the regular treatment was of no value in my hands, homeopathic treatment did not demonstrate its superiority.

In the study of the principles of homeopathy one is surprised at the large number of the same or similar symptoms produced by drugs of a dissimilar nature; again, at the number of diseases dissimilar in their nature and manifestation that are treated by the same remedy. Gunther mentions eighteen remedies useful in paralysis, and indicates that there are many more. Haycock uses arsenic in about fifty diseases of the lower animals; aconite in over thirty diseases. Do all these dissimilar diseases have a totality of symptoms to correspond to the totality of the symptoms produced in an animal by a single drug? But it occurs that the symptoms of a disease may be removed in an animal and the morbid condition remain. Again, drugs do not produce the same or similar symptoms in healthy animals that are produced by some maladies which are treated by these drugs. Strychnin does not produce symptoms like paralysis, but it is used in paralysis by homeopaths. If the therapeutic law of Hahnemann were true most maladies would be incurable.

Homeopathy is not based on nature, but upon nature's most superficial and variable phenomenal symptom. No system can become scientific on such a basis. A few years ago I joined a class in Christian Science. In this system patients were cured of their maladies of whatsoever nature; ruptures were declared healed; tumors were dissipated; rheumatics threw away their crutches and bed-ridden subjects walked again. It looked like an era of miracles revived.

The founder of Christian Science in America, Mrs. Mary B. G. Eddy, was a homeopathic physician. In her work, "Science and Health," she says, speaking of fevers such as

scarlet, typhoid, etc., that the higher the dilutions given the better success. She says it is not medicine but mind that heals. From this experience, Mrs. Eddy thought she had discovered another proof of the power of mind to heal. But Dr. Robert Bartholow in his work on *Materia Medica* says, speaking of the same subject, "Since we have learned the natural history of certain fevers, such as scarlet and typhoid, we find they can be most successfully treated with little or no medicine." Here was the secret and the truth. Christian Science condescended also to treat the lower animals. We tried it. It was "weighed in the balance and found wanting." Were it not for human ignorance and credulity, Christian Science would have no following. But side by side with the boasted cures of Christian Science, I place the boasted cures of homeopathy, and refer both these systems to nature, the only healer. But what benefit can these systems hope to achieve in treating patients that can exercise neither faith nor imagination. But the homeopathic physician of today is instructed in anatomy, physiology, pathology and allied sciences. He tells you that under the privilege of expedients he may employ any means, a remedy or a dose, in order to effect a cure. But here the law of *Similia similibus curantur* practically ends. Only in a very limited sphere is the great therapeutic law subservient, and in that sphere mind-cure and homeopathy meet.

In order to correct a wrong impression and one apparently shared by some physicians, let me state here that there is no Allopathic School. Hahnemann coined the word allopath and applied it to those opposed to his principles. To be an allopathist would mean to be a member of an exclusive school. The principles underlying our school have been already mentioned. Again we are spoken of as the "Old School" in contrast with the "New School" meaning homeopathy. If by this is meant that ours is a school of antiquated ideas and non-progressive, the name does not fit us. What valuable discoveries have been made in medicine that were not made by the regular school? No one will assert that homeopathy has placed a stone in the edifice of pathology or added any fact of value to medicine. The great therapeutic law of homeopathy was not original with Hahnemann. Paracelsus had announced it 300 years before Hahnemann had his practice and began

to experiment upon the action of drugs upon persons. The results obtained he called "provings." Today provings yet constitute the mass of homeopathic literature. By careful provings it is shown that drugs may produce almost an endless number of symptoms; from 2000 to 3000 having been recorded of some drugs. Dunham says it is scarcely possible to analyze the actions of belladonna upon the human system. But a comparison of these provings shows that many drugs of opposite nature will give the same proving. That the provings include the sensations of the organism that occur during the proving period (but independent of drug influence), there can be no doubt.

One thing, however, was original with Hahnemann. It was the idea of the infinitesimal dose—the potentizing of drugs. He believed that the higher the potency the greater would be the power of the drug. None were high potencies unless above the thirtieth. No known method of science can detect a trace of medicine in a potency above the fifteenth, scarcely above the third. It cannot be the medicine, then, that is so powerful to cure. It is now held to be the potentiality produced by giving the vehicle containing the drug a certain number of shakes—twelve shakes for a tincture and so many turns for a triturate. The more shakes and turns the more power in the remedy, until it may become very dangerous. Every drug is held to have a certain definite molecular activity which, by shaking, is imparted to the vehicle. Thus the vehicle becomes the remedy. It in turn imparts its molecular activity to the diseased protoplasm, which it restores to a normal condition. But this modern and ingenious explanation has not and cannot be demonstrated. It is not, therefore, of any scientific interest. But, as before mentioned, since the safety of the law of similars depends upon the infinitesimal dose, it becomes necessary to resort to ingenious theories to prove there is virtue in the medicine prescribed in this manner. But we are not informed why the vehicle does not impart its molecular activity to the drug, or why the drug as it grows infinitely less in higher dilutions yet imparts an increased molecular activity. Hahnemann taught that when an insoluble substance was raised to the third potency in milk sugar, to obtain the fourth potency alcohol might be used, since the drug at this potency becomes soluble. It is to be presumed that

his sense of sight and taste gave him all his knowledge of chemistry.

There are upwards of eight hundred remedies in the homeopathic pharmacopeia. The United States Pharmacopeia contains less than one-half that number. The remedies are drawn from every department of nature; some of them will be regarded with curiosity and surprise. Apis mellifica is made from the stings of bees. Lachesis from the venom of a poisonous snake. Lyssin from the saliva of a mad dog. Vulpis hepar from the liver of the fox. Mephites from the odor substance of the skunk. Psorinum is prepared from the pus of the human itch. A tincture has been prepared from the pus of gonorrhea and administered internally to cure that disease. The insect world furnishes the bedbug, cockroach, house fly, head louse, wood louse, ant, potato bug, spider and others. These insects are crushed and their juices received into alcohol or milk sugar. These tinctures are used for internal medication. The tendency to use the remedies and doses of the regular school of medicine has become general among progressive homeopathic physicians. A traveling man for a wholesale drug house informed me recently of his having good customers in the homeopathic fraternity; that he sold more tablets to homeopathic than to regular physicians.

The homeopathic physician who, a number of years ago, urged me to practice veterinary homeopathy, and who treated me with homeopathic remedies, gave the following prescription to one of my acquaintances:

℞

Potassi iodidi	℥iv
Stillingia, fl. ext.	℥ss
Syr. sarsaparillæ co. aq.	℥iv

Sig., etc.

I reproached him with: "Doctor, is this homeopathy?" His reply was: "What difference does it make if the medicine will do the patient good?" These illustrations show that the law of "*simila*" is not sufficient, and is only partly adhered to, and then in minor ailments of the human family and in maladies that require more nursing than medicine. The Homeopathic Society of New York in 1879, by a vote of thirty-three to fifteen, resolved that in the treatment of disease the formula

causa sublata tollitur effectus (cause and effect) is often to be remembered and used to advantage (Browning on "Homeopathy"). In a recent number of the *Homeopathic Monthly*, Dr. Duke makes the broad statement that the law of similars is not applicable to any diseases which are characterized by destruction of tissues, or where the cause cannot be removed, or to such as are due to chemical action, mechanical violence, or unhygienic surroundings (Browning on "Homeopathy"). The *Medical Investigator* (a homeopathic publication), in 1876, said reprovingly: "How many claiming to be homeopaths are entirely disregarding the law of *similia*? It is getting to be quite a rare thing to hear of a homeopathic practitioner conducting a serious case from beginning to end without using as such cathartics, sudorifics, diuretics, etc., in direct opposition to our law" (*Encyclopedia Britannica*, ninth edition).

Says a writer in the *Homeopathic Times*, "To give one or more persons a drug, and register all their peculiar fancies and ideas, does not furnish any reliable evidence of the real effects of the drug." Says one homeopathist, "The question of potencies seems to have aroused a spirit of contention in the homeopathic fraternity about as bitter as any between the old and new." Dr. Kidd says: "I have cast aside dynamized drugs *in toto* as untrustworthy and unjust to the sick" (Browning on "Homeopathy").

With the homeopathic house divided against itself—with modern medical discoveries tending away from and not toward the doctrine of "*Similia*,"—Isopathy is in no scientific sense like homeopathy. With the achievement of excellent success in the field of veterinary medicine according to the rational principles of the regular school, with boundless scope for the exercise of inventive genius and investigation afforded by a system of medicine that is bound by no law but is free to work out the secrets of nature in her department through the exercise of observation, experiment and reason, and thus to eliminate error and arrive at truth, should we not be proud to be workers in such a field? To any who wish to investigate this matter I refer them to works from some of which I have quoted, viz, "The Organon of the Healing Art," "The American Homeopathic Pharmacy," "The Homeopathic Encyclopedia of Pure Materia Medica," Hahnemann on "Chronic Diseases,"

Gunther, Haycock, and Boeriche and Tafel on "Veterinary Materia Medica," the *Encyclopædia Britannica*, 9th edition, also to an admirable essay on "Homeopathy" by Dr. Browning of New York.

ADDRESS AT THE INAUGURATION OF THE NEW YORK STATE VETERINARY COLLEGE, SEPTEMBER 24, 1896.

By Professor James Law.

It seems desirable to say a few words to you collectively in view of the inauguration of a new enterprise in America—a State Veterinary College. As an English-speaking people we have been especially influenced by English example in shaping many of our institutions, and in none more so than in those to which veterinary education has been committed. It has been a crowning glory of the Anglo-Saxon races that they have suspected and frowned upon a too paternal government. In Europe and America, in South Africa, Australia and New Zealand, a prominent aim has been to restrict the functions of government to the protection of the citizen in his personal rights of property and conscience, in his lawful business enterprises, and his pursuit of pleasure. Education, it is true, came in for a constantly increasing share of national control and support, but this was for long mainly along classic lines, and was a legacy which came down to us from the early monastic and ecclesiastical schools. For purely secular education money was slowly and grudgingly allowed, with a wholesome dread of the evils to be apprehended from class legislation. That instinct of even-handed justice which demanded for the citizen a trial by a jury of his peers, naturally recoiled from any proposition which looked like an appropriation of public money for the creation or benefit of any special class or guild. It is only in recent years that the manifest value to the nation, in its competition with other nations, of the highest knowledge and skill in science and arts, has led to the founding and support of technical and professional schools of all kinds, to keep the country in the forefront of the race of civilization and progress.

As the Anglo-Saxon peoples have gradually awakened to the need of government provision for technical education, those branches which seemed to be of the greatest material value were naturally the first and most liberally dealt with, while those in which the prizes were smaller or the triumphs less striking, and competition less close, were still left to shift for themselves.

In Great Britain there has never been a State Veterinary College, and the four existing schools have been all founded by private enterprise and conducted independently of State grants.

In America, as in England, the veterinary schools have been private ventures, and consequently largely dominated by the financial results. The founders of such schools were met at the threshold by the imperative questions:

Will the venture pay?

Can we secure fees enough to sustain it?

Will the name of the college bring us greater and more remunerative practice?

Will the prospective fees, fame and practice warrant the investment?

The answer is necessarily dominated by the question of money, and the temptation is great to subordinate the educational considerations. The pressure is heavy: 1. To shorten the curriculum; 2. To admit ill-prepared candidates; 3. To graduate large numbers, irrespective of fitness; 4. To further abridge the already short course, and as a final degradation; 5. To sell diplomas.

To this last, lowest depth of sordidness more than one veterinary college in America has sunk. But short of this, even the surviving and honorable colleges have been one and all prevented from achieving the status which the nature of the subject demanded. The preliminary education and the trained mind which are requisite to the successful pursuit of the science, have not been required for matriculation, and the course has been abridged to such an extent that even a trained mind cannot successfully cover the required ground in the time allowed him. Meanwhile the field of veterinary science has been rapidly enlarging, deepening, widening and becoming more thoroughly cultivated, so that the insufficiency of the untrained student and his short curriculum have become more and more marked year by year.

The contrast with the schools of veterinary medicine on the continent of Europe will emphasize this statement. In entering a continental veterinary school the student must show that he has graduated from a *real skule*, *gymnasium* or *college*, and he must pursue a veterinary course of from three years and a half to five years, of nine or ten months each, ere he can hope to secure a degree. Add to this that the great advances in medicine have been such that the great majority of the students have to study one additional year ere they can secure the coveted diploma, and we can appreciate the hopeless inadequacy of a course of two or even of three sessions of five or six months each, which has not been preceded by a mental training in high school or college.

These continental veterinary colleges would have been no more thorough than the English or American had they been dependent on private enterprise. But there is no veterinary college on the continent of Europe today that is not a ward of the government. Each one has been founded and is sustained by the commonwealth just as are the army, the navy, the experiment farms, etc. This paternalism is founded on a long experience of their value, of which I may be permitted to give a single example.

The disease, rinderpest, which confines its ravages to ruminants, and, as its name indicates, almost entirely to cattle, formerly spread over most of Europe at frequent intervals, killing twenty to ninety-five per cent. of the bovine race at a single invasion. Paulet tells us that in Western Europe in three years (1711-14) it cut off 1,500,000 head of cattle, and Faust says that in the whole of Europe in four general invasions dating from 1711, it destroyed no less than 200,000,000 head. At $20 per head this reaches the astounding sum of $4,000,000,000. So late as 1844, according to Raynal, it destroyed 1,000,000 head in Southern Russia alone.

Thanks to the veterinary profession of Europe, this disease can never again attain such boundless sway, and though still extended at intervals in the course of belligerent armies, or in the channels of trade, it is always met with intelligent measures of control and speedily suppressed.

This is but one of the deadly plagues of the Old World, the ruinous extensions of which led, in 1762, to the establishing of the first European veterinary school at Lyons, France, under

the presidency of Bourgelat. This was followed, a year later, by a second school at Charenton, near Paris, and still later by a third at Toulouse. These were succeeded by a score of others in the different countries of the continent, all at the national charge and under government control. They are justly looked upon as economic investments, not only for the restriction and extinction of the plagues, formerly so rife and fatal, but also for the conserving of the lives and efficiency of the horses of the cavalry and artillery; for the protection and fostering of the various animal industries, and indirectly, though no less certainly, for the paramount preservation of the fertility of the soil.

The results have abundantly vindicated the wisdom of the investment:

The protected herds have furnished a cheap and abundant food for the growing populations.

The increasing demand for cattle food, and the multiplying of the natural sources of rich manure, have combined to enrich the fields and improve the crops.

The improved agriculture and abundance of food products, have fostered every branch of manufacture and trade and contributed to a substantial prosperity.

The contrast in countries where veterinary science has been ignored is quite instructive. In South Africa, apart from the mining interests, grazing has long been the main source of wealth. Into this country lung plague was imported in infected Dutch cattle in 1854, and extending on the unfenced grazing tracts, under a semi-torrid climate, proved so disastrous that, according to Lindley, whole herds of 100 or 200 head would perish without a single exception. At that time the Matabele chief occupying land protected on two sides by inaccessible cliffs, successfully defended his passes against the diseased cattle and saved the wealth of his people.

Now, recently, a cargo of cattle from infected Hindostan has implanted the still more redoubtable rinderpest in South Africa, and in the disturbed condition of the country this has penetrated even into Matabeleland and bids fair to destroy the cattle industry of South Africa.

Again, the lung plague, imported into Australia in 1859, in a diseased English cow, was allowed to spread over the whole island continent, and permanently blighted the cattle industry in one of the finest pasture lands on earth.

In England this same lung plague in the forty years succeeding 1842, cost the nation $500,000,000.

In the United States the same plague prevailed in our eastern seaboard States for over forty years, causing losses that have never been estimated, and incidentally leading to an embargo on American cattle in England, which entailed a loss of ten dollars a head on an average to the exporter. This alone amounted to $2,000,000 per annum. It was only when the plague reached the centre of our cattle traffic (Chicago), and bade fair to invade the whole country, including the unfenced Territories, and to repeat in America the experience of South Africa and Australia, that the national and State governments were roused from their lethargy, and we were empowered to take efficient measures for its extinction. Happily now it has no place on this continent, and with reasonable precautions can never make a new invasion.

The same line of thought and similar historic facts could be followed and adduced as to the other animal plagues, including the affections caused by the larger animal parasites; as to enzootic diseases caused by faulty conditions of the environment; as to constitutional diseases, due to errors in breeding, diet and regimen, and as to local diseases, many of which are due to improper treatment.

In America as in Europe we can successfully maintain that the benefits already drawn from the veterinary profession have abundantly vindicated its claim to State support. But the prospective value of the work of veterinary investigation and education far exceeds all that they accomplished for the nation in the past. Among our horses glanders yearly claims a large and valuable sacrifice to its devouring poison. Among cattle, anthrax, tuberculosis, and Southern cattle fever cause widespread though needless destruction. Among sheep, flocks are decimated everywhere by remorseless parasites, internal and external. Among swine the preventable infectious fevers cost the nation on a low estimate 20,000,000 per annum. Among fowls the prevalent contagious affections are no less disastrous.

In the matter of numbers, the wealth at stake in the live-stock of America is as great as that of European nations, and to the reasoning mind, is no less exacting of measures for its protection. In four of the most important countries of Western Europe, the aggregate of the farm mammals is considerably

less than that of the United States. Yet these four countries of Western Europe (France, Belgium, Holland and Germany) have eleven veterinary schools maintained and fostered at State expense. Surely our own Empire State with its 9,500,000 of farm mammals, with its large emporia at Buffalo, Albany and New York, for the reception and diffusion of live-stock from other States, and its record of a recent riddance from a cattle plague, which for over forty years had hung like a pall on the cattle industry of the State, and exacted a tax of $2,000,000 or more per annum from home herds and exports, is fully justified in establishing a State Veterinary College.

But if the more economic advantage would demand such a step, how much more would the protection of human health and life? How much of the physical disease and death of man is due to direct transmission from corresponding diseases in our domestic animals, is only now beginning to be realized.

Among parasites some of the most deadly of man's tormentors came directly from our live-stock. Trichina, echinococcus, the beef and pork tapeworms, strongylus gigas, and actinomycosis may be mentioned in this connection.

Among microbian diseases the list is no less redoubtable. Glanders, farcy, rabies, tetanus, milk sickness, tuberculosis, anthrax, malignant edema, septicemia, erysipelas, gangrene and infectious osteitis, may be adduced as examples.

The more intimately we acquaint ourselves with the subject of communicable or contagious disease, the more deeply are we impressed with the fact that there is the closest relationship and interdependence between these affections as they appear in man and animals. Indeed, in many cases, as in the echinococcus, the beef and pork tapeworms and even the trichina, the successive appearance of man and animal as the host of the parasite, at the different stages of its development, is a condition of its propagation. So far as we know, it is impossible for the echinococcus or of the beef tenia, to live in the same host or in a host of the same genus in both its larval and mature condition. Man harbors the larva and the dog the tenia, or the calf entertains the larva and his master the tenia.

In the case of contagious affections due to microbes, the same alternation from man to beast, and from beast to man, is not so essential to their maintenance, and yet the intimacy of the relation between the domesticated animal and the civilized

man is so close that many such diseases are largely propagated in this way. In this sense glanders and anthrax stand out as largely industrial diseases. The first appears in persons having close relations to horses or to horse products—grooms, coachmen, stablemen, cowboys, soldiers, farmers, horsedealers, knackers, veterinarians, surgeons, tanners, gardeners—whose daily avocations lay them specially open to direct infection. The second is a disease of farmers, cattlemen, shepherds, butchers, tanners, hair and wool-workers.

But neither disease is by any means restricted to these classes. These suffer more numerously, but others suffer in a limited degree, through less direct channels of contagion. And the danger of such irregular transmission is in exact ratio with the number of diseased animals that are allowed to survive in a district. A single glandered animal is a source of no great danger. He may be even used on public highways, but his contact with or proximity to man is necessarily somewhat restricted and the human risk is correspondingly small. But let him have free scope to infect others, and these to infect others in turn, until one can hardly enter a street without meeting an infected animal and having him snort his deadly, nasal discharge over his person, and into one's nose, eyes and lips, and the danger at once becomes imminent. Let glanders be neglected in a street-car-stable until its victims are counted by the score, or on a horse ranch until the diseased mount up into the hundreds, and the danger, first to the caretakers, and second to the general public, is greatly enhanced, and human victims of this most loathsome and deadly disease become comparatively common. Let a grocer, baker, milkman, or other vendor of human food keep a glandered horse and use it in his delivery wagon, and the hands of the driver alternately coming in contact with the virulent discharges and the articles of food threaten to become a very direct cause of infection to his unsuspecting customers.

A single anthrax animal would also be primarily a source of apparently little danger, but when that diseased subject is allowed to contaminate other animals and even susceptible soil, which can retain and propagate the bacillus, the danger to both man and beast is enormously increased. Brought up from the graves, by the rising of the soil-water in wet seasons, or by the intervention of the earthworm or the burrowing

rodent, then dried up and blown by the winds upon the vegetation ; drawn up from wells in the drinking water ; borne along by streams and rivers to new localities ; carried on the feet, and even in the stomachs of vermin, birds and insects, and implanted in the skin by their mandibles and biting apparatus, the bacillus finds many channels of conveyance and numerous modes of infection. Delivered from the butcher's stall into our kitchens, the meat of an anthrax animal is liable to contaminate other food, through knives, forks, plates and other articles, and even to cause direct infection through the resistance of the spore to the heat of cooking.

Of late years the general public has been more exercised over tuberculosis than any other complaint which is common to man and beast. There is doubtless good reason for this. This *white plague of the north*, by far the most deadly affection of man, killing one-eighth of civilized humanity, and attacking one-fourth or even one-third at some period of their lives, is also the most prevalent chronic disease of our dairy herds, and its extension in the human race bears a remarkable ratio to the utilization of the bovine races for dairy products and beef. Piscivorous tribes like the western islanders of Scotland are usually remarkably free from tuberculosis, as are also the native Chinese who are vegetarians. The ruling Tartar race in China, on the other hand, are beef-eaters and largely tuberculous. In Egypt and Algiers in the comparative absence of bovine herds, the great influx of consumptives has not materially deteriorated the health of the native population, while in Italy, Australia, Hawaii and Madeira, where the population freely consume the product of the bovine race, the rush of phthisical health-seekers has led to a great extension of tuberculosis among the natives. Among tribes of our own Indians, who feed on the raw flesh of the ox, too often diseased, 50 per cent of the total mortality is from tuberculosis.

Concurrent testimony obtained on so large a scale, and from such widely different sources, is not to be lightly set aside. Tuberculosis is mostly a chronic disease, frequently lasting through a long lifetime. A certain number of cases recover, many more remain dormant, ready to burst into renewed activity whenever the health is otherwise undermined. It is essentially a "pestilence that walketh in darkness," and often under an outward guise of health, the subject of the disease carries

around the germs of certain death to his unsuspecting and more susceptible fellow. The very latency of the disease in certain systems, and the absence of all prominent outward manifestations of illness, is a potent factor in the propagation of the infection. A disease that is quickly fatal, like smallpox, plague, yellow fever or cholera in man, or anthrax, rinderpest or Texas fever in cattle, is easily dealt with, since wherever the germ exists in connection with susceptible subjects, its presence will be speedily manifested, and it can easily be circumscribed and crushed out. These make their attack in broad daylight as with great sound of trumpet and roll of drum, and we are warned to fortify every pass and strengthen every defense. But the stealthy tubercle bacillus, which glides up in the darkness and silence, and as it were saps our walls of defense without visible manifestation or audible sound, and suddenly appears, when least expected, in the interior of our most trusted keep, is by far the most dangerous enemy.

To neglect our defense because of this subtlety is to abandon our cause and play the poltroon. This is not the part of modern science ; this is not the course of the medicine of today and of the future.

To the biologist who has studied the infinitesimal focus of parasitic life, the subtlety of the germ is but a challenge to meet its inroads by a more effective strategy, to meet its hidden mines by equally able countermines, and to turn an otherwise assured defeat into an accomplished victory.

But in doing this he can never safely abandon the first principles of warfare. He can never neglect a favorable opportunity to reduce the number of the enemy, nor to prevent him from securing reinforcements. Yet this is just the course that is strongly urged in regard to tuberculosis. Because some recover, and because other cases remain long latent, we are urged to let such cases go on in their work of indefinitely multiplying the disease germ, and to attack them only when they become acute and deadly. Acute cases don't live long to propagate the disease; whence then comes the constant succession of cases? Mainly from the latent and recovering ones.

Our own university herd is a standing example of a sound prevention of this infection. Formerly affected with tuberculosis, it has now for a number of years been entirely free from the affection, in spite of many risks, and in spite even of the

presence in the barn, for several months, of a latent and unsuspected case, which had been brought from another herd. Had we left that dormant case in the herd after its discovery, it would in all probability have sooner or latter developed into active disease, and become the source of a new general extension of tuberculosis in the herd.

It is impossible, in a short lecture, to lay down infallible and iron rules for dealing with this, or any similar disease, under all possible circumstances. Special conditions may warrant special measures. In the case of valuable animals, where economic considerations would warrant the supervision, separate herds of dormant cases may be allowed for breeding purposes, if they can be kept carefully apart from all other stock, their milk products denied to man or animals, and all acute cases weeded out from the herd as soon as they can be detected. Above all, if such breeding herd of dormant cases can be subjected to a continuous out-of-door life on the open prairie, where the chances of recovery are highest, and the risk of contagion lowest, they may be made profitable by fattening their healthy progeny for beef, or still more so by the perpetuation of a valuable strain of blood. Under such professional supervision, and frequent testing, the actually recovered animals could in due time be removed from their still questioned companions and restored to a guaranteed herd.

But the one who would argue from this that the actual though somewhat latent and dormant cases should be left in the herd that has been tested and proved to be above suspicion, is but pleading for a free field for the propagation of the contagion. The acute cases that would develop at intervals would entail new victims, no longer among the latent cases and suspected animals only, but among the tested and sound as well.

Under average condition, with low-priced cattle, and a State indemnity, the slaughter of all the tuberculous would be the course of economical and successful sanitary work, and when special conditions rendered another and less radical resort permissible, it should only be adopted when hedged about by such precautions as would obviate danger to man and beast.

We know enough about the dreaded tuberculosis to say that we can deal with it successfully under the most varied conditions, but our past achievement does not imply that we have as

yet reached the limit of possible success in this disease; and a similar success in a State or nation would not warrant us in saying that no better measures can be taken. Such a conclusion would be utterly unscientific and unduly conservative. It is the best at present known to us. But in these days when knowledge advances in leaps and bounds, no one can say what tomorrow may have in store for us. Some as yet unknown Edison or Tesla may be even now preparing a surprise in the revelation and utilization of natural forces of which we little dream, and which may cast into the shade our steam engines, our electric telegraphs, telephones, phonographs and skiagraphs.

So in the field of biology and modern medicine. The largest hopes and the brightest ideals are likely to prove the most scientific. The vivid imagination and the scientific foresight must unite to help in our future progress. Not in the case of tuberculosis alone, but in connection with the entire field of medicine, a whole phalanx of possibilities big with promise for the future of humanity confront us.

As biologists we see genera, species, and even varieties of animals that are largely insusceptible to this and that deadly disease. It is for us to grasp the cause of this immunity, and if possible to render it available over a wider area.

As bacteriologists, we recognize incompatibilities and antagonisms between the living cells of the animal body and their products on the one hand, and the pathogenic microbe and its products on the other. How far can we avail of these to strike a balance favorable for and productive to the animal? We are as yet on the mere confines of this great science of bacteriology. In the vast microscopic world full of attractions and repulsions of living cells and microbes, of neutralizations, and physiological antagonisms of leucomains, ptomains, toxins and enzymes, of sozins and phylaxins, there are many and bright promises for the future of preventive and therapeutic medicine. But it is only the trained mind rich with the knowledge already attained in this science that can hope to achieve the triumphs of the future. Knowledge, skill, imagination, sound judgment and indefatigable industry, must combine in the man who would hope for success in this field. It is no place for the dull or the laggard.

Without undue arrogance it may be asserted that to us has been allotted a large measure of responsibility in relation to this

work. By the generosity of the Empire State we are enabled to enter on the field. We have been furnished with the nucleus of a scientific institution from which large and important results may fairly be expected. We are honored as being in a sense the pioneers in a comparatively new field, we have the place of advanced guard in the inevitable warfare. Though small in numbers, our chosen battlefield is one in which numbers count for less than quality, and in respect of quality we have to prove ourselves. Let us take as our primary thought the Socratic aphorism: "Knowledge is virtue: ignorance is crime." In our case this is preeminently—I may say painfully—true. As the beneficiaries of the State, we shall prove unthankful and unworthy if we fail to make the best use possible of its bounty. As trusted representatives of science, it is expected of us that we fortify ourselves with the lore of the past and strike out with clear vision, steady foot and strong hand for future achievement. To rest satisfied with any knowledge short of the best of today, is to neglect our opportunity and prove untrue to our trust. The lore of the past can never be safely set aside, nor entirely ignored. Yet this has led up to so much that is more recent, clearer, more definite, and full of so much greater potencies, that with Socrates, we may say it is criminal to neglect even its smallest lessons. The accumulated knowledge of the ages is great and indispensable, but is small indeed unless we build upon it the riper fruits of its own modern development. This is true for teacher and student alike, for are we not all students in one common school? Some of us may have advanced to a higher grade, while some are but entering the lowest class, but success will crown each only as he devotes his best energies to his work in the spirit of truth, and with the ardor of the enthusiast.

In this, as in all else, we must approve ourselves as men. The veterinary profession has long suffered from the low appreciation in which it has been held. Every one who has conceived an attachment to animals, has thought himself competent to deal with their diseases. Our State is crowded with men who, without further preparation or fitness, have been legally established as veterinarians by a simple registration of their names as such. To the future graduate it is given to redeem the profession from this low public estimate. He must everywhere approve himself first as a man of character, a good man and a

good citizen. Next he must approve himself as a man of science. His judgment and his word must be authoritative on all matters that involve his profession, and the great interests connected with animal industry. He must be an educator in the highest sense. Wherever his lot may be cast, with whatever class of domestic animals he may be called upon to deal, he must charge himself with the task of bringing to the work the accumulated knowledge of the centuries, and especially of the wonderful century which is drawing to its close.

Some of you may be called upon to engage in the extinction of animal plagues. In this, spotless integrity must be joined to the highest knowledge and skill, and conjoined to a deep insight into human nature, and an inflexible purpose of applying even-handed justice, if you would escape the danger of being overwhelmed in the storm of detraction and misrepresentation that will inevitably assail you. The honorable prize to be won is a great one, but it requires a good soldier and a sterling man to bear the brunt. When the complete triumph comes, you will find that your whilom detractors, who have opposed you in perfect good faith, will come forward to acknowledge their error and endorse your achievement. Some will be called to inspect markets and food products, and here with the weighty responsibility of a city's health on your shoulders, you will bless the day that brought you through the vigorous studies of anatomy, physiology, histology, pathology, toxicology, and enabled you with scientific certainty to endorse the wholesome and condemn the diseased and unwholesome.

Some I trust will be called to fill chairs of comparative pathology and comparative medicine now for the first time being established in the most forward medical schools, and which must soon be provided in all such schools that are worthy of the name. None can fill such a place so well as the man who has profoundly studied the special diseases of animals, and indeed none other is fitted to do justice to such a chair. Ever since Hippocrates, the most advanced physicians have recognized and employed the lower animal as a means of advancing medical knowledge. Our knowledge of physiology largely consists in deduction from experiments made on the lower animals; our acquaintance with the physiological action of drugs and poisons very largely consists in accurate observations made on the lower animals; pathology, surgery and medi-

cine owe much—very much—to the same source; and bacteriology is essentially based on experimentation on the beast. Comparative medicine, therefore, can be best pursued by the veterinarian, who, otherwise equally well furnished with the medical candidate, adds to his accomplishments a thorough practical knowledge of all animal diseases. This will quicken his insight into pathogenic causes and the significance of morbid phenomena, will protect him against hasty and erroneous conclusions, and will make his work at once more productive and more reliable.

Others will be called to undertake investigations in our agricultural experiment stations, where the same wide and accurate knowledge, the same keen insight and skill and the same scientific methods, can alone bring out valuable results.

For all such future fields of usefulness you must now make ample and thorough preparation. Patient labor, earnest and systematic effort, daily accomplishing of the day's problems in a thorough manner, will make the work easy, and assure success.

In entering this institution you begin in a very special sense your work of life. Outside of the professional school the work of preparation has been essentially general and introductory. In the professional college you start upon what you have especially chosen as your life's work.

BOVINE DIPHTHERIA.[1]

By J. F. Winchester, B. Sc., D. V. S.,
Lawrence, Mass.

In presenting this subject it is my expectation that some may be induced to make closer examinations after death of animals that die from apparently mysterious diseases. I use the expression "mysterious" from the fact that in the *outbreak* that I shall cite, if I may so term it, the mystery was looked for in the well, the hay and the pasture with negative results.

In the course of time a case similar to those that had died presented itself, and that animal was given to me. As a result of that gift I present this paper today. Aside from the clinical

[1] Read before the U. S. V. M. A., Buffalo, Sept. 2.

picture and post-mortem conditions as they appeared to me, you will recognize the acknowledged authorities on diphtheria whose works I have consulted and from whom I transcribe.

Diphtheria.—The word diphtheria is derived from the Greek word signifying *parchment.*

Synonyms.—Diphtheria among mankind has been described by writers in different countries under a variety of names, such as *cynancha maligna*, *cynancha contagiosa*, *angina maligna*, *angina gangrenosa*, *malignant sore throat*, *epidemic croup*, etc. This malady was described by Bard in 1789 under the name *angina suffocativa.*

The distinctive characters of the affection were very clearly stated by Bretonneau (1821 to 1826), who applied to it the term diphtherite, whence originated the name diphtheria, proposed by Trousseau. This name, the significance of which relates to the most characteristic local lesion, namely, the false membrane, has the negative merit of not involving any hypothesis concerning the pathology of the affection.

Diphtheria is defined as a specific infectious disease, characterized by a local fibrinous exudate, usually upon a mucous membrane, and by constitutional symptoms of varying intensity. The presence of the Klebs-Löffler bacillus may be regarded as the etiological criterion by which true diphtheria may be distinguished from other forms of pseudo-membranous inflammation.

Etiology.—Diphtheria is endemic in the larger centres of population, and at times becomes epidemic. It is a fact that while other contagious diseases have diminished within the past decade, this malady has increased in cities. It is not confined to cities; it has prevailed in country districts, and the affection in many instances seems to be specially virulent.

Sporadic cases occur under circumstances which seem to render it impossible that the special germ of diphtheria had been introduced from without, but a similar apparently spontaneous development of other contagious diseases occurs, so that these instances cannot overthrow the general belief in the contagiousness of diphtheria. It is true that it is often impossible to trace the source of infection in cases of diphtheria. "The experimental inoculations of animals with diphtheric exudation has not yielded decisive results."—Flint.

There is evidence of the transporting of the virus by individuals who may not become infected with the disease. The

contagion of diphtheria often adheres tenaciously to localities where it has gained a foot-hold, and months may elapse and then a case occur. Surroundings and conditions do not appear to be connected with the causation. It occurs at all seasons of the year, but most frequently during changeable weather. The period of incubation is generally between two and eight days, but it may be longer. The disease is often limited in its prevalence to a circumscribed area. It has been observed to be restricted to a few houses, a single house, or to a narrow strip of land on the banks of a stream.

The special cause seems to require auxiliary causes, at present unknown, which are peculiar to certain localities. Epidemics differ as regards certain features of the disease and the rate of fatality. In respect to variations at different times and places, diphtheria resembles other epidemic diseases.

Clinical History.—Diphtheria presents in different cases such differences that some authors have described several varieties of the disease. The marked point of difference relates to the development of the disease. The attack is sometimes abrupt, beginning with a chill more or less pronounced, and followed with a marked elevation of temperature.

At other times the disease may begin with symptoms denoting great prostration. When the development is gradual and insidious, and there are few or no local symptoms pointing to the existence of the malady, the characteristic affection of the throat reveals the disease. When the fauces alone are involved there is seldom any pain or soreness, and in some instances the sensibility is diminished. Incomplete paralysis of the muscles concerned in deglutition, which is sometimes a sequel, may be a concomitant of the disease, rendering swallowing of liquid more or less difficult, as evinced by regurgitation through the nose. The breath may be fetid.

When the false membrane extends over the buccal mucous surface, it occasions more or less pain on the introduction of food or drink into the mouth, together with ptyalism and stiffness of the parts.

When the nares are affected there is a discharge, which may be limited to one nostril. The gravity of the disease is commensurate with the extent of the local affection and the abundance of the exudation. However mild cases may be at the outset, there is always a liability to the occurrence of diphtheic

inflammations in new situations, to the development of grave symptoms and to important sequelae.

The symptoms vary with the anatomical system involved, namely, circulatory, cutaneous, respiratory, digestive, nervous and urinary. The pulse may be frequent at first, then suddenly fall below the normal. Epistaxis is sometimes profuse, and there may be hemorrhage from throat and mouth, which denotes great danger. The skin rarely presents much increase of heat, and not infrequently in the course of the disease the surface becomes cool or cold. Pyrexia, as a rule, is less than in most other acute diseases; however, it may be high.

Petechial spots or ecchymoses are sometimes observed, generally in connection with hemorrhage from mucous surfaces. In some cases the skin presents an anemic aspect, even when hemorrhage has not occurred. Diarrhea is not uncommon, and is a bad sign. In the majority of cases the mind is unaffected, but delirium does occur; convulsions and coma occasionally occur and are forerunners of a fatal termination. The probability in these cases is that it is due to uremia.

Albuminuria is a frequent symptom, but it varies considerably at different times. In cases in which albumin is abundant, the diphtheric exudation is generally large, and the glands of the neck usually tumefied. Hematuria has been observed in some cases presenting symptoms of purpura.

The duration of the disease is between one and two weeks. In fatal cases death may occur as soon as forty-eight hours. On the other hand, the illness may continue for an indefinite period, owing to the sequelae. They form an important part of the clinical history; anemia and general debility are likely to persist for a considerable period. Death may occur from heart failure. Paralysis, involving both voluntary and involuntary muscles, is a characteristic sequel.

The lesions of the paralysis have been found in the central nervous system, in the spinal nerve roots and in the peripheral nerves. The anatomical basis of the paralysis does not seem to be the same in all cases. In several cases lesions of a multiple degenerative neuritis have been found. The characters of the paralysis—particularly the usually rapid recovery—are, in many cases, in favor of the peripheral nature of the lesion.

Pathology.—When a mucous membrane is injured in such a way that its epithelium dies without desquamation, while its

blood vessels are damaged and pour out an abundant exudation, it sometimes happens that the dead epithelial cells become saturated with the exuded liquid, and then pass into a peculiar condition of rigidity akin to coagulation.

The seat of this change appears to the naked eye as a dull-grayish, raised patch, surrounded by red and swollen mucous membrane.

The exudation is rich in albumin, and the transformed cells take on the appearance of a coarse mesh-work almost or altogether devoid of nuclei.

The subepithelial areolar tissue is beset with filaments of fibrin and leucocytes. Hemorrhages are not uncommon. Inflammations of this kind, in which the tissue itself coagulates in a solid mass, are called diphtheric. When the necrosis and coagulation extend only to the epithelium we may speak of the process as superficial diphtheritis. It is not necessary that the whole of the epithelium ultimately affected should perish at the outset; some part of it, at least, may perish secondarily in consequence of the inflammation.

Superficial diphtheritis occurs chiefly in the organs of the throat, but the conjunctiva and the epithelium of the urogenital organs are also occasionally attacked. The structure of the respiratory organs and the intestines seems not to favor this form of inflammation. When their epithelium perishes from any cause it is usually shed or dissolved away, and a croupous false membrane is formed instead of the diphtheric coagulation. Necrosis and lymph coagulation of the tissue are the distinguishing features of the diphtheric inflammation; whether it is superficial or deep, its nature is the same—the seat is of secondary importance.

Deep or parenchymatous diphtheritis affects a greater extent of tissue than the superficial form. It is characterized by the coagulation, not merely of epithelium, but also of the underlying connective tissue.

The affected patch is swollen and assumes a whitish or grayish tint, the discoloration extending through the epithelium to the connective tissue structures. The epithelium in some cases is lost altogether, and then the diphtheric patch consists of dead connective tissue only. The patch is turbid and granular in texture, or it may be homogeneous or composed of amorphous hyaline blocks. The nuclei are always

more or less completely lost. The small vessels which permeate the patch show signs of a homogeneous transformation of their walls.

The necrotic tissue is separated from the living by a zone of cellular infiltration. Fibrinous filaments are seen here and there through the mass. The lymphatics in the neighborhood contain coagula and leucocytes. Necrotic inflammation may attack any of the mucous membranes, and is especially common as a result of infection of one kind or another. It is often demonstrated that it is associated with the invasion of the tissues by bacteria.

The formation of the necrotic patch or slough is not the first stage of the diphtheric process. The sloughs themselves act as irritants, and set up inflammation around them. Superficial epithelial sloughs become in this way infiltrated with pus, and so are loosened and cast off. The loss of substance is then made good by regenerative multiplication of the remaining epithelial cells. Larger and deeper sloughs may in like manner be separated by suppurative inflammation taking place around them, and the deficiency is then made up by the formation of a cicatrix, which in process of time may be covered over with a new epithelium.

But the process often maintains its destructive character for a considerable time, extending continually to greater depths, and often inducing intense purulent inflammation over a wide area around the initial lesion.

Sometimes the necrotic inflammation takes on a gangrenous character, that is to say, micro-organisms penetrate the diseased tissues and set up in them septic decomposition. The affection is then much more grave, for the products of decomposition act as highly noxious irritants to the tissues that are still healthy. Definitive suppuration may, however, lead to the separation of the dead tissue from the living, and so allow the process of repair to begin.

Neuritis, simple or multiple, is due to the irritant being brought by the blood or lymph to the nerve, inducing the inflammation, and is regarded as a direct result of the general infection.

The history of the cases on which is based the theory that cows may be susceptible to diphtheria, will be found in the following pages. The facts about three of the five cows were

gleaned from the owner and attendant. The third cow had been sick three weeks before I was called, while the fifth and last was under my observation from the beginning.

At the commencement of the outbreak there were four cows kept on the place. A cow was bought in September that did not contract the malady. Later in the fall two heifers were purchased, and one of them designated as No. 5, died the following March.

In the middle of July, 1893, a cow, about to calve, was turned out to pasture on a side hill having low land at the base. The evening before parturition she was apparently all right. The next morning the cow could not get up and the calf was dead. The owner thinking the cow was spent from the exertion, had her put on a drag and taken to the barn.

Arriving at the farm the cow got up, and there was noticed a thick discharge from the nostrils; the lower eyelids were swollen, and there was a continous flow of tears, besides well-marked ptyalism. She had trembling spells (chills) attended with hurried respiration, paroxysms of pain, at which time she manifested mental disturbance.

The appetite was deranged, but she would eat and drink a little at times. The bowels acted, but not so often as normal. The back was arched, with periods of well-marked straining; urination was quite frequent, and she wasted in flesh quite rapidly. This condition continued for six days, and she died in severe paroxysms. This animal was not housed with the rest of the herd, and there was only one attendant for all. The attention given this animal was smoking the head, washing away the discharges, and giving her such remedies as the owner and attendant thought desirable.

Seven days after No. 1 died, another was noticed to be sick, and the first thing to attract attention was a swelling of the eyelids with a copious discharge of tears. This was soon followed by a discharge from the nostrils and ptyalism, which was accompanied by a frequent attempt at swallowing.

Associated with these symptoms were trembling, arched back, tenesmus, soon to be followed by nervous hyperesthesia, which induced the owner to have her killed on the third day of her sickness.

August 12, the third cow was taken sick, and presented the same symptoms as the others, but not in so acute a form as

the second. I was called to see this animal after she had been sick for three weeks. I found her breathing short and quick. Her head was pressed against the wall; the conjunctivae were swollen, the pupils dilated, and a copious discharge flowing from the lachyrmal ducts. The discharge from the nostrils was thick, while that from the mouth was frothy. Her appetite was fair, and the functions of the body were normal, with the exception of the secretion of the milk, which was completely stopped.

It being impossible to lead her any distance, she was killed by bleeding, and the post-mortem revealed a congestion of the brain. The rest of the viscera were apparently normal, but the throat was not examined for reasons well known to some of this audience.

Nothing more went amiss with the cows until the following November, when on the 25th a fourth cow presented symptoms identical to the other three, with the exception of the feces, which were black and covered with mucus. This cow died the second of December, 1893.

On February 25, 1894, the fifth animal, a heifer, was taken sick with the same symptoms as the other four. This is the animal to which I referred earlier as the gift, the one whose sickness I watched throughout.

I found her with a temperature of 106° F., pulse very much increased in frequency, and the artery small. The respirations were very much hurried and trembling. The skin was wet with perspiration which stood out in drops. There was a copious discharge from the nostrils of a thin tenacious character, with frothing at the mouth. The conjunctivae were swollen, and the mucous membrane livid, with a continual flow of tears.

Auscultation of the lungs revealed well-defined mucous rales, which were very noticeable along the trachea, increasing at the larynx. Pressure on the larynx was objected to, and caused the respiration to become audible, and the animal to swallow.

The feces were dark in color. The next day the breathing was still hurried, the throat very sensitive to pressure, while the temperature had dropped to 103° F. under the influence of veratrum viride. The discharge from the mouth and nostrils had increased, and the secretion from the conjunctivae was abundant. Her appetite was gone, and she did not eat or

drink after the second day of her sickness, which lasted for eight days.

The feces at first were dark in color, at times coated with mucus, but during the last few days she had diarrhea. Blindness became apparent toward the end of her sickness, and when standing she would press her head against the wall.

The urine was at times bloody in color, according to the statement of the attendant, but when I saw it, it was thicker than normal and of a deep amber color.

During the time she was under observation, aside from the described symptoms, there was nothing about her actions to attract attention. She gradually wasted in flesh and her strength diminished until the sixth day when she aborted, being seven months gone. This was her first offspring.

Death occurred March 3, two days later, and it was so gradual that the attendant who was near by did not know it for a time. The post-mortem was made four hours later.

Necropsy.—Emaciation, no tympany, discharge from eyes, nostrils and mouth; skin dry, shrunken and with difficulty removed; the blood-vessels directly under the skin filled with blood. On opening the abdominal cavity the blood-vessels in the serous membranes were filled with blood.

The spleen was atrophied; stomach and intestines apparently normal; liver hypertrophied, with gall bladder full of a dark, viscid, tarry bile. The substance of the liver was friable, yellowish in color, filled with blood and with capsule adherent. Lungs contained several hemorrhagic infarcts. The pericardium contained a small amount of serum, dark in color, and the walls of the heart presented petechial spots. On the outside of the auricles under the serous membrane was an amber-colored, apparently gelatinous exudate.

The cavities of the heart were filled with semi-coagulated blood. An ulcer was found on one side of the tongue near its base. The mucous membrane of the pharynx and larynx was covered with a yellowish-brown, tough membrane that was adherent.

A large elliptical ulcer was present at the base of the epiglottis, and the mucous membrane of the trachea for its entire length was dark-brown in color, with a similar adherent new growth, as was found in the larynx.

The bronchial tubes contained a large quantity of froth, but were free from the adherent membrane. This new formation was subjected to the microscope by Dr. J. M. Parker, and he was of the opinion that the Klebs-Löffler bacillus was present in the tissue. In order to confirm his opinion a portion of the tissue was sent to Dr. H. C. Ernst, of Harvard Medical School, and he reports as follows:

HARVARD UNIVERSITY MEDICAL SCHOOL,
Bacteriological Laboratory,
March 29, 1894.

Dear Doctor:—We have found, in section of the material from the trachea of that cow, bacilli that in size and general appearance resemble very closely, if they are not identical with, the Klebs-Löffler bacillus.

Very sincerely,
HAROLD C. ERNST.

In connection with the report of these cases, it may be of interest to know that during the first week in August, 1893, the attendant of these cases was taken sick. The nature of the sickness was acute indigestion with severe pains over the entire body, attended by sickness at stomach, vomiting and purging. Accompanying this was general lassitude and lameness. The attending physician pronounced it a case of La Grippe. In November, and again in the following March, the same symptoms were developed. Since then he has been in perfect health, although the period of convalescence was long.

My attention was called to a cow, June 26, 1895, with a temperature of 102⅘° Fahr., pulse 54, and respirations 12.

Ptyalism was abundant and frothy, and there was a thick albuminous discharge from the nostrils, but not profuse. Lower eyelids were edematous with slight lachyrmation.

Cow stood with the head carried to one side, when she could not rest it on the fence. The bowels were torpid, and the secretion of urine apparently checked.

The act of swallowing took place frequently. Pressure on the larynx was objected to, and at the same time the respirations became audible. Auscultation along the trachea revealed increased mucous rales in its upper third.

When made to walk, there appeared a partial loss of the power of co-ordination, so much so that she staggered. She

had the appearance of being cold, for the hair along her back stood up and pointed forward. The attendant informed me that she had spells of trembling, and at or about that time she became uncontrollable. The secretion of milk dropped from six to one quart a day, this being the second day of her illness.

The following day, June 27, at noon, the pulse was 60, respiration 24, and the temperature 102$\frac{3}{5}$° Fahr. The discharge from the nostrils was more abundant and thicker than on the previous day, conjunctivae edematous, and abundant ptyalism. Aside from these symptons there was a marked shrinking or wasting of the body. During this period she would neither eat nor drink.

At 2 p. m., she was started for the knacker's, a distance of about three miles, by being led.

Thrice on the way she had paroxysms of choking with acute ptyalism, and a copious discharge from the nostrils. After a short rest she would again resume her walk. During the distance she did not cough, The bowels remained torpid, but there was an abundant discharge of urine. At the end of her journey she was turned into a yard and left for the night. The next morning, June 28, at 9 a. m., I found her dead, lying with the head to one side and on her sternum, and under the mouth quite a pool of saliva. There was no evidence of a struggle.

Necropsy at 10 a. m.

No bloating, skin wrinkled, with the appearance of parchment, pupils dilated, and a general shrinkage of the entire body. The mucous membrane of the vagina was red with a mucous discharge.

On removing the skin, the veins under it were filled with blood, and it was adherent, as if the animal had been dead two or three days.

The abdominal viscera were apparently normal with the exception of the kidneys, which presented centres of congestion.

The larynx presented numerous gray elevations well defined ; the mucous membrane at the base of the epiglottis was thickened and rough.

The mucous membrane of the trachea and large bronchial tubes was studded with petechial spots, and at places the ecchymoses were confluent. The smaller bronchi were filled

with a frothy secretion. Pericardium contained considerable dark-colored fluid.

Ecchymotic spots were well defined over the surface of the heart, while along the edges of the auricles under the serous membrane there was a well-defined yellow serous exudate. The external coats of the large blood-vessels at the heart were studded with ecchymotic spots.

On opening the heart it was found to contain semi-coagulated blood which was in evidence throughout the system.

When the meninges of the brain were exposed there escaped considerable clear serum. The blood-vessels of the brain, on the surface and in the sinuses, were engorged with blood.

The larynx was sent to Dr. J. M. Parker, of Haverhill, and he made the following microscopic report :

August 29, 1896.

Doctor J. F. Winchester,
Lawrence, Mass.

Dear Doctor.—The larynx of the cow shows in its middle ventricle an ulcerous patch about ⅜ of an inch in diameter. Posterior to the vocal cords are also two raised epithelial patches, showing in section a dense fibrinous exudate beneath, which is a mass of small-celled proliferation.

On staining with alkaline methylene blue (Löffler's solution), numerous short, thick, slightly curved bacilli, resembling the bacillus of diphtheria, were seen.

Yours truly,
John M. Parker.

My object in presenting this paper is to stimulate further investigation on this subject, that the true nature of this disease may be demonstrated.

Professor Osler, in his work on the practice of medicine, (1892), says: "Cows are not known to be affected spontaneously." The literature relating to Veterinary Medicine (in English), that I have had the privilege of consulting, does not make mention of the existence in cows of such a malady.

Having presented to you the clinical symptoms, and the post-mortem appearances as observed by me, a description of the microscopic lesions, with the demonstrated presence of the organisms by those trained in such work, I leave the further investigation of the subject to those better qualified to carry it on.

HEREDITARY INFLUENCE.[1]

By Dr. W. Herbert Lowe,
Paterson, N. J.

It is not my purpose to discuss the various laws governing the transmission of qualities and characteristics from parent to offspring, which facts are well known to scientific veterinarians, but rather to show how by a practical application of these laws animals with stamina and constitution can be bred that will possess a decided disease-resisting power. Heredity plays an important part in predisposition and in immunity.

It is well known what the trotting-horse breeders of this country have accomplished in breeding for speed. It is equally well known what the breeders of cattle have accomplished in breeding for special purposes. Much has also been accomplished in the same way with the dog and other domestic animals. I am sorry to observe, however, that in not a few instances these results have been obtained at the expense of substance and stamina. In the horse, many faulty conformations of body and limb are transmitted that predispose to disease as the animal reaches maturity and is put to work, or in training. Many so-called excellently bred young horses, with fine pedigrees, are sold every spring and fall in the great sales at Madison Square Garden and elsewhere in New York City, that inherit defective conformation or predisposition to weakness, which will be developed when the exciting cause makes its appearance. Breeders of pedigreed horses are well aware of this fact, and do not wait for the unsoundness to develop, but rush them to the sales.

In this connection I wish to emphasize the fact that many diseases are classified as hereditary, when, in reality, it is the predisposition that is hereditary. This predisposition may be a peculiar diathesis, though more often it will be found upon close study and observation, to be due to a defective or faulty conformation of body or limb.

Every kind of unsoundness, whether constitutional or dependent upon defective conformation of body and limb, or faulty action, should be excluded by the breeder. It is only

[1] Read before the Veterinary Association of New York County, October 7, 1896.

by a systematic method of exclusion and careful selection that the best results can be reached.

Stallions that have been excluded from European show-yards by reason of hereditary unsoundness have been known to have been imported into this country and exhibited here, and even placed on the prize list. I mention this to show the importance of proper veterinary inspection of horses before they are eligible to receive any prize. A system of veterinary inspection at horse shows and State fairs would prove of distinct and far-reaching value to the horse-breeding industry of the United States.

What the trotting-horse breeders of this country have accomplished is the wonder of the world, but in their enthusiasm to produce speed, they have followed, in many instances, pedigrees without regard to stamina and hereditary diseases, and, consequently, we see many beautiful young colts breaking down in training. If breeders would only be as careful to exclude pathological defects and faulty conformation as they are to secure choice strains of blood, there would soon be an improvement in quality and stamina, that would be of lasting benefit. Stallions should be examined as to soundness, taking into consideration ancestral conditions. If stallions were required to have a license, those calculated to depreciate the breed could be excluded from stud purposes.

We all know that in time of war a city that is not properly fortified is easily taken by the enemy. So, the animal body, if not fortified with a strong constitution and stamina, will be readily invaded by the micro-organisms of disease. The proper pabulum or soil for the development of microbes is only second in importance to the microbe itself. All persons exposed to the infection of tuberculosis, smallpox or scarlet fever, do not take the disease, because all are not alike susceptible. All men that eat the flesh or drink the milk of tuberculous cows do not contract tuberculosis. Yet, whatever in any degree weakens or impairs the system of men or animals renders them more liable to the invasion of disease. The animal that inherits a strong constitution and good health possesses a disease-resisting power that often means an immunity. If this principle of heredity were kept in mind in breeding dairy cattle, there would not be so much tuberculosis. Sanitary conditions, climate and food have, of course, much to do

with the development of tuberculosis, but on this occasion I will confine my remarks to the hereditary transmission of weak and impaired animal bodies from sire and dam to offspring. To this phase of the subject I attach a great deal of importance, for I believe that it is only by a system of breeding, founded on a scientific knowledge of the laws governing heredity, that tuberculosis will be eradicated. The fact that tuberculosis is caused by the tubercle bacillus, and is not hereditary, does not lessen the importance of breediug dairy cattle having substance and stamina sufficient to resist the development of the micro-organisms.

The etiology, diagnosis and pathology of bovine tuberculosis are now well understood by the profession, but when we attempt steps to eradicate the disease, economic limitations and other questions arise. Dr. Salmon, Chief of the United States Bureau of Animal Industry, estimates that to make one inspection—test all the cattle—killing affected animals, would, in the State of Pennsylvania alone cost over five million dollars. He suggests a more conservative and less expensive method of co-operation between the farmer and properly constituted authorities. Whether the so-called "radical method," or Dr. Salmon's more conservative method of stamping out the disease be adopted, a new crop of the disease would again soon appear and necessitate another inspection and further expenditure of money, unless something further was done than destroying affected animals and adopting sanitary measures. What is the *practical* use of destroying the animals now affected in a given State, if we continue to breed and raise young cattle, which, when they are developed and forced to their full milking capacity, will not be able to resist the tubercle bacillus?

In the eradication of bovine tuberculosis the question of property, animal and human life are all at stake, and if the desired result can be accomplished more readily and more completely by a practical application of the laws governing the transmission of qualities and characteristics, we would certainly be taking an important step in advance. The work of extermination in various localities has been well done, and the sanitary regulations adopted effective, but I would go still further and breed dairy cattle that would inherit such constitution, stamina and vigor as to have a practical immunity from an invasion of the bacillus of tuberculosis. If some steps are not taken in this

direction we will find that in the course of a few years another battle against the disease will have to be waged at great cost to dairymen, farmers and the State. The remedy is in our hands, but it will be necessary for the breeders of dairy cattle to understand the importance of this phase of the subject, and that the remedy is to breed only from the class of animals already alluded to. "Like begets like."

TUMORS OF THE BRAIN AND CRANIAL CAVITY.

By A. Labat.

[Begun in the August Number.]

Symptoms.—The two essential elements which determine the symptoms of tumors of the brain are their volume and their location. These two elements are independent of the nature of the growth. Whether cancerous, osseous, fibrous or cystic, the tumor always possesses a certain volume and, occupying the same space, exercises pressure upon the encephalon and determines troubles of the same order.

Besides, the parts compressed may be inert or active. In the first case, the compression is without effect, and if it does produce one, this is due to the transmission of the pressure to other parts; in the second case, the functions dependent upon the parts will be altered. It follows from this that certain tumors may remain indefinitely without any outward symptoms, and may be found only at the necropsy; others, latent at first, will in time produce cerebral phenomena; some, finally, by marked symptoms give evidence of their existence from their commencement.

The symptoms are due to the direct action of the tumor which irritates, disorganizes or destroys the brain tissue in contact, and which determines certain definite alterations, such as edema, congestion and inflammation; they may also result from an influence upon other parts at a distance, because of the organic connection of the latter with those that are primarily involved. It appears, therefore, that the symptomatology is susceptible of numerous variations, according as the tumor exercises a more or less firm pressure, is complicated with secondary lesions,—edema, congestion, inflammation,

occupies such and such position, or, finally, as the affected parts are or are not closely connected with other centres. In fact, the clinical phenomena can be reduced to a small number of types whose expression becomes significant, as, note for example, the various phenomena of paralysis when the tumor acts upon the cranial nerves or their centres of origin.

The symptoms sometimes develop very insidiously. The subject may become more or less indifferent to his work, may grow listless and assume unusual attitudes while resting; mastication may be interrupted; the other functions, however, may be performed normally. The attitude of the head is altered; it is carried lower and seeks a point of support. The animal progresses slowly or rapidly towards *immobility*. Immobility follows a fatal course, characterized sometimes by a marked, deep and continuous coma, sometimes by mitigations and exacerbations, by acute paroxysms, sometimes, finally, by a morbid state of moderate intensity and but little alarming—heavy walk, unusual attitude, head low or carried to one side, but appetite preserved as well as sufficient energy to work.

In other cases the pathologic troubles appear suddenly or after a short prodromic period, and resemble the manifestations of meningo-cephalic congestion or inflammation. The animal is taken while at rest or during work, in apparent good health or already affected with long standing immobility more or less marked. The periods of excitation and coma succeed each other in the ordinary manner; in some subjects the former predominates, in others the latter. At the end of a certain time the nerve disorders terminate either in death during a violent paroxysm, by general paralysis which gradually passes into a profound state of coma, by immobility, or, finally, by a return to the normal conditions. Immobility ordinarily follows without anything very remarkable; the paroxysms become less violent and less frequent in spite of the active cause, the tumor. The return to health is sometimes complete and the subject performs his work as before. But this improvement is not permanent. As the tumor progresses these meningo-encephalic attacks may be renewed. The meningo-encephalitis also may reappear under the influence of the excitation which the presence of the tumor causes in the nerve elements, even when the volume of the growth has not changed. The consequences are the same as in the preceding attacks. All causes capable of

favoring an afflux of blood to the brain (violent running, heat, too rich food, etc.), in those animals eminently so predisposed, are capable of giving rise to these vertiginous attacks. But these latter increase the volume of the tumor, which thus becomes a more potent cause. It is therefore necessary to avoid these exacerbations by all proper medicinal and hygienic means. The attacks and remissions may alternate, but rarely, because the tumor usually immediately produces permanent lesions directly from atrophy of the nerve tissue, and indirectly through the circulation and the nerve reflexes. The morbid manifestations become permanent, they form the "immobility" syndrome. Sometimes the first significant symptoms consist of an epileptic attack. Afterward the subject appears well or presents only mild symptoms, head low, slow walk, sleepiness, etc., with a general state otherwise satisfactory. Nevertheless, epileptic attacks have been seen in animals more or less completely affected with immobility. The attack comes on while resting, during or immediately after work. The muscles of the head show clonic contractions and carry the head in diverse directions; sometimes the contraction is tonic and the head is maintained in a fixed position, low, inclined to one side. The jaws move convulsively, the saliva dribbles from the mouth, the lips are retracted; the eyes are fixed or pivot in the orbits; there may be abolition of sight and hearing; the subject totters on his feet or assumes an attitude as if about to fall, and the attack terminates in falling. The patient remains immovable for some time before consciousness returns, sometimes in a state of apparent death. The attack is of variable duration, from seconds to a few minutes. It is repeated at undetermined intervals. When the attacks recur frequently, several in the same day, for example, it is rare that death is far distant. If they recur less frequently and finally cease, the animal recovers his usual condition, but always presents a more or less stupefied expression. Immobility, meningo-encephalitis or a renewal of the attacks finally terminate the scene.

Until the present, no one has remarked that the volume and the seat of the tumor have any influence upon the production of the one or the other morbid manifestation mentioned above. The epileptic attacks, for example, were coincident with cholesteatomata of the cerebral choroid plexus in a horse (Leblanc), with a chondroma in the pons varolii in a dog (Generale), with

an encephaloid carcinoma at the anterior extremity and superior part of the left cerebral lobe in a steer (Mauri), etc. The same diversity is observed with tumors in the development of immobility and inflammatory troubles of the brain.

Nevertheless, some special signs are nearly always added to the morbid phenomena enumerated and help to determine the clinical aspect of the case.

The tumor determines *paralysis* by the local irritation and by secondary lesions—edema, congestion, inflammation, etc., which it causes. The paralysis is complete or incomplete. It is temporary or permanent: temporary, at the beginning, when the lesions are acute and capable of resolution; permanent when the lesion is retrogressive or is not secondary, and especially when the tumor is large and the anatomic alterations—the effects of the compression—have assumed a persistent character. Often there is a general paresis which renders locomotion difficult, the movements slow and indifferent, and falling down more or less frequent. Sometimes the phenomena are better defined, there may be hemiplegia, as in a dog observed by Chauveau—while walking the right biped showed a decided weakness, and during station it was gradually flexed, almost to the point of falling; there may be paraplegia, as in the case of Mollereau, the patient, a horse, was affected in the hind quarters and fell down whenever the head was raised; there may be paralysis of one member, as in a horse described by Thomassen, etc. In one horse the jaws were paralyzed at intervals for periods of several hours; during these attacks he would lie down as if paralyzed for a variable time; on one occasion he remained recumbent for twenty-six hours, and on another two days (Pratt).

Of all the paralyses the most remarkable are those which involve the cranial nerves. Facial hemiplegia, paralysis of the tongue, of the jaws, of the ears, of the eyelids, of the oculomotor nerves, etc., are the most frequent. It is likewise with paralysis of special nerves, as the auditory and optic; deafness and blindness (the pupil being contracted or dilated), were symptoms seen in a large number of cases. These paralyses are characteristic. While they are sometimes caused by secondary lesions, they are most frequently determined by the direct pressure of the tumor upon the nerve; for example, the compression of the facial and the trigeminal by a melanotic

tumor in the horse (Bouley and Goubaux); compression of the chiasma of the optic nerve by an epithelioma in a horse (Mollereaux), etc.

The *position of the head and the defects in locomotion* are dependent upon the irradiation of the symptoms, and by the lesions of the surrounding parts. The carriage of the head is defective ; it is generally depressed, or resting on a support, and often inclined laterally.

Locomotion frequently is in a circle, sometimes continuously in one direction, (right or left), sometimes alternately on one side and the other. The circle described may be very small. Leblanc spoke of a horse which almost pivoted upon a hind member, twisting the litter around it, which finally prevented his further movements ; as soon as he was released the previous movements were continued. There is no positive relation between the direction of the circle described, and the situation of the tumor. The inclination of the head is a better indication of the seat of the morbid growth. It seems that the poll is most often turned toward the side opposite to that of the location of the tumor ; thus, the poll lowered toward the left, and the nose inclined toward the right would coincide generally with the symptoms produced by tumor in the right half of the cranium.

The *incoördination of the movements* has been mentioned by several authors, and not always with a precise localization of the tumor in the cerebellum. Cadiot and Roger, for instance, have seen this condition in a bitch in which the left lobe of the cerebellum had been disorganized by a voluminous encephaloid sarcoma. But Cadéac also speaks of a horse in which these movements were equally marked, and at the necropsy he found an encephaloid sarcoma towards the median commissure of the cerebrum at the level of the olfactory lobes.

Choreic convulsions and contractions are more rare. Cadiot and Roger have noticed in a bitch a continuous agitation of the muscles of the head and neck which hindered the prehension of food and abraded the cheeks from constant rubbing against the litter. Leloir has seen a horse whose anterior members were seized with convulsive movements so that locomotion consisted of jumping movements.

The *sensibility* is sometimes not altered. In general the patient does not show any evidence of pain—even diffuse—in

the region of the cranium. In certain cases the sensibility is very much lessened. In others, it is very much increased; the skin of the horse may show such hyperesthesia that he will try to bite the hand that touches it (Zundel). A horse fought viciously when head and breast were approached, and squealed when one attempted to touch these parts (Bruyaut); a bitch, during the latter stages of the disease, emitted moans, which could only be attributed to cephalalgia. (Chauveau).

The nutrition is affected in all subjects. They emaciate more or less rapidly, even when there are prolonged remissions during the disease and when they are well nourished.

Course, Duration and Termination.—The course of these morbid phenomena is intermittent or continuous, according to the case; intermittent, when they are characterized by meningo-encephalic congestion or inflammation occurring in paroxysms, or by attacks of epilepsy; continuous, when, from the commencement of the morbid manifestations, the material alterations are well defined and irremediable—immobility and paralysis. The length of the remission is very variable, several days, weeks and even months. The recurrence is sometimes incited by fatigue, indigestion, heat, etc.

Sooner or later the lesions engendered by the tumor become permanent and the symptoms continuous. From this time, the patient presents ameliorations and exacerbations, depending on whether or not the surrounding lesions and the symptoms of irradiation are temporarily relieved by the accommodation of the brain tissue to the actual volume of the tumor.

The condition varies much in different patients. The most frequent type is the following: The subject is to a certain degree immobile, and subject usually to coma, or vertigo, or epileptic attacks.

Often the vertiginous attack or the epileptic seizure is the forerunner of approaching death; sometimes they pass off without aggravating the condition of the subject. Ordinarily, they leave him in a more or less precarious state; the nervous disorders are aggravated and the paralysis intensified.

The tumors of the encephalon remain enclosed within the cranial cavity which generally suffices as a barrier to its further expansion. Neverthless, sometimes there is seen a deformity and absorption of the bony wall under the pressure of the tumor. The malignant tumors, melanosis, cancer, have a

strong tendency to spread through the natural orifices of the cranium which give passage to the vessels and nerves. In one case, in a cow, the parietal bone was found to be perforated by prolongations of the tumor. But these facts are rare because of the insufficient time given to the patient before being destroyed; the subject, being useless, is sacrificed.

The *duration* of these processes is undetermined. It depends upon the slow or rapid progress of the tumor, the ease with which the tumor creates secondary lesions, the importance of local or secondary lesions which are determined, its malignant nature, etc. Upon this point the location of the tumor must be especially considered. There are some parts that possess but little irritability (hemispheres, white commissural parts), and others, on the contrary, that are very sensitive (medulla, optic and striated bodies). In the first case the tumors remain latent and are tolerated for a more or less long time. In the second case the symptoms occur more or less early, the local and secondary disorders appear suddenly, and the vital energy of the patient is soon exhausted. All these causes assist in hastening the termination.

Death is the only termination. It is caused either by the acute nervous troubles that are developed, epilepsy, meningo-encephalic congestion or inflammation, or by the gradual progress of immobility, paralysis and other accidents.

Diagnosis and Prognosis.—On account of the variety of the symptoms, one is often obliged to confine himself to a general diagnosis: *chronic hydrocephalus*, *meningo-encephalitis* and, more vaguely, *immobility*.

The comatose and vertiginous paroxysms and the epileptic attacks have an equivocal value because they belong to cerebral lesions other than those caused by tumors.

The intermittency of the epileptic attacks, the comatose and vertiginous paroxysms interrupting a state of health more or less satisfactory or, again, manifesting themselves in the course of a permanent state of somnolence and stupor, constitute important diagnostic signs. These phenomena are shown quite regularly during the progress and evolution of cerebral tumors.

The existence of phenomena such as muscular contractions and convulsions during the intervals which separate the epileptic and vertiginous attacks, are also of some value in indicating the presence of cerebral tumors. Paralysis of regions supplied

by cranial nerves is also a characteristic sign, and is present more especially with tumors situated at the base of the brain. Nothing is known as to the condition of the bottom of the eye when vision is affected. Ophthalmoscopic examinations of the eye would perhaps reveal some useful and interesting information.

To recapitulate: the diagnosis is very difficult; there is no absolute pathognomonic sign. It is necessary to rely upon paralysis of the cranial nerves, the repetition of attacks of epilepsy, coma and vertigo, muscular contractions and convulsions, upon the succession of morbid manifestations, and, finally, the course of the disease.

To prove the presence of a tumor in the cranium is very difficult, but the difficulty increases when one attempts to determine its nature. On this point, the probabilities must be borne in mind, the relative frequency of the diverse tumors; unfortunately our knowledge in this respect is very meagre.

Some special tumors, melanotic, tuberculous, cancerous, may be diagnosed by the general condition of the patient and by external manifestations of a melanotic, tuberculous or cancerous diathesis, nevertheless, let us recall that cancer of the brain is primary, and that it may cause death before generalization and cachexia have had sufficient time to develop.

The *prognosis* is absolutely grave, whatever may be the nature of the growth, on account of the importance of the organ affected, the cerebral complications which are in themselves dangerous to life, and, finally, the impotence of therapeusis.

Treatment.—There is no curative treatment and all therapeutic means are powerless. If there is reason to believe the existence of a tumor of the brain, the wisest plan is to slaughter the animal for meat, in the case of cattle. In other animals treatment may be attempted if the subject is still capable of rendering services.

The indications are all symptomatic. As soon as congestion or inflammation of the brain or the meninges appear they should be relieved by bleeding, by cold applications to the head, external and internal revulsives, etc.

A recurrence may be avoided by careful hygiene.

This medication may relieve those forms of paralysis due to secondary and curable lesions. When the paralysis and the

secondary cerebral lesions have been made permanent and irremediable by the age of the tumor, all resources are ineffective; external revulsives, electricity and internal medications are of no avail.

The epileptic attacks and convulsions should be treated with bromide of potassium, chloral, etc.

Immobility should be combated by the various hygienic and therapeutic means usually employed in this condition, and they need not be repeated here.

Blisters upon the head, setons upon the neck, etc., are inefficacious.

PATHOGENESIS OF SIDEBONES.

The ossification of the lateral cartilages of the third phalanx, which are a component part of this bone, always spreads from the bone from below upward and backward.

Instead of assigning the usual traumatic influences to the production of side bones, Lesbre thinks that this pathologic change is prevented by the very mechanical function which these cartilages perform under normal conditions. They are at each step pressed outward from the centre of the foot by the plantar cushion and inward by the wall, and maintain their normal condition only by this elastic play, as if "it held at a distance the ossifying process." When this play ceases or becomes modified, the bony transformation commences. This ossifying process is seen in joints immobilized for a long time, in the cartilages of the ribs, and in the cartilage of prolongment of the scapula in old subjects. Sidebones are, besides, produced so much more constantly as there is congestion of the internal structures of the foot.

The flat foot realizes the most essential of these conditions and it may be said that the tendency toward the formation of sidebones is proportional to the width of the hoof.

Nevertheless, hollow and steep-walled hoofs are not exempt, because by their contraction the cartilages lose their elasticity and the foot becomes congested and inflamed.

En résumé, two causes may be assigned to sidebones: (1) Defective play of the lateral cartilages; (2) a congestive or inflammatory state of the bone. Most often the two operate simultaneously. X. LESBRE.

ABSTRACTS.

TRAINERS AND HORSESHOERS.

In a paper read by Robert Bonner at a dinner recently, that gentleman had the following to say about trainers and horseshoers:

"I have often been asked: 'Why is it that trainers and horseshoers know so little about shoeing?' I answer that question in this way: Because they know nothing, generally speaking, of the anatomy of the foot and have no disposition to give the requisite time to acquiring a knowledge of it. Besides. they are too old to learn. It is to the rising generation that we must look for improvement in this line. In my experience I have found that, while old trainers and horseshoers may appreciate two or three new points about the horse's foot, you will make them, with few exceptions, angry with you and disgusted with themselves by giving them too many pointers—points which they can neither comprehend nor 'digest.' The result of this will be that they will not only feel like abandoning the study of the whole subject as being too intricate and complicated, but will become secretly angry with you for demonstrating to them how very ignorant they are on everything about the foot. Besides they do not want the owners of horses to know that they are so ignorant. They feel, to quote a phrase from Scripture, that their craft is in danger of being set at naught. Such men must be taught as if you taught them not, and things unknown proposed as things forgot.

"What makes the subject of horseshoeing so difficult to master is that there are almost as many varieties of feet as there are of the human countenance. It does not follow that a shoe that may suit one horse of a team will suit his mate. When Maud S., for instance, made the fastest mile that was ever made on a regulation track to a high-wheel sulky, she carried nineteen ounces on each forward foot, while Sunol carried only eight ounces when she made the fastest mile that was ever made to such a sulky on a kite-shaped track. One great thing to be remembered, however, is that the shape of

the hoof must be made as far as possible to correspond with that of a well-formed coffin bone and that the shoes must not be allowed to remain on the foot longer than three, or at the outside, four weeks."—*Horseshoer and Hardware Journal.*

THE RINDERPEST IN SOUTH AFRICA.

In spite of the great efforts made and the vast sums of money spent by the various colonies and states in South Africa to prevent the spread of the cattle plague, the dreaded disease continues to advance, and prevails over large districts in Rhodesia, Bechuanaland and the Transvaal. According to Dr. Edington, the Cape Government bacteriologist, the disease is the real rinderpest, which has been known for hundreds of years past, and he states that unless it is stamped out, all the cattle in the country will be swept out of existence. It costs the Cape Colony £1000 a day to guard its borders. The disease spreads very rapidly and is now devastating the Transvaal.

The authorities in the different colonies and States recognize the gravity of the situation, and are doing all in their power to fight the disease. Cattle can now only be moved from one district to another under the strictest regulations, the penalty for breaking which is a heavy fine, or, in default, imprisonment.

In Bechuanaland the natives have lost nearly every head of cattle, and have themselves killed the remainder and made them into "dried beef." In the district under the chief, Khama, over 100,000 head have died. Thousands of carcasses lie rotting on the ground, and the smell is awful. Even the birds of prey refuse to touch these carcasses, and near Buluwayo men are paid ten shillings a day to bury them.

As to the origin of the present outbreak of the disease in South Africa, there is good reason for supposing that it first made its appearance among some cattle imported from Germany into German East Africa, whence it eventually worked its way into Rhodesia. In Rhodesia the disease has been identified with that known locally as the "Zambesi cattle fever," and it is beyond doubt the same disease which has for five or six years past devastated other regions in Central and Eastern Africa. Time after time, travelers have sent home accounts of

its ravages, and Captain Lugard himself, in his published account of his travels, confirms the story of desolation. As far back as 1892, indeed, Captain Lugard advocated a scientific inquiry into the nature of the disease and the necessity of attempting to find some method of recovery. Unfortunately, nothing came of the suggestion, and when, a short time back, the disease reached Rhodesia in all its virulence, no one knew exactly how to deal with it.

CONSTIPATION IN ELEPHANTS.

By J. A. Munn, F. R. C. V. S.,
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On the twenty-fifth day of November, at a late hour, I was hurriedly requested by the warrant officer in charge of the transport animals to visit their lines, as four of the elephants at this station had been seized with violent illness, and had been so for some time. On arrival I found that two males and two females were suffering from colic, the males and one female being very ill, indeed. The jemidar mahout had administered various remedies, the nature of which I am not Oriental scholar enough to comprehend; but as I found that all the animals were excessively constipated, and two had passed nothing for nearly twenty-four hours, I gave directions to administer, if possible, about half an ounce of croton seeds, and to have the animals walked about, so as to get the bowels to act. The night being dark and stormy, and the hour so late, I could do nothing more. The next morning, on my arrival at the transport lines, I found one elephant (a male) dead, and two others (a male and a female) in a very bad way, indeed, and evidently suffering great pain. The drivers had been unable to administer any drug, and no feces had been passed during the night by two of them, i. e., for about thirty-six hours. In addition, there was much tympanites, the abdomen being blown up like a cow's. The animals had been walked about all night, but with no result; and not knowing what else to do, I resolved to attempt to administer an enema with the station fire engine, which was the only piece of apparatus I

could think of that would throw sufficient water. I obtained the use of it—an ordinary manual engine, with a leather hose and a copper nozzle about four feet long. This was rigged up alongside a tank in the elephant lines, and the first animal—the remaining male—was brought up and tied to two trees, care being taken that the suction-pipe was clear of the bank and did not pump up any mud. I tried to administer the enema to the animal when he was lying down, but he would not keep quiet. It was quite successfully given, however, when he was standing. After the nozzle had been inserted about two feet into the rectum, a large quantity of water was pumped, which overflowed; and after five minutes the effect was sudden and most marked, an enormous quantity—a hundred-weight, more or less—of feces being expelled. The relief given was as if by magic, and a second administration of water brought away a still larger quantity of feces. I then had the animal exercised for about ten minutes, a third motion taking place, other motions occurring at intervals all the afternoon. Shortly after the third motion the animal began to feed, and I had a little more than half an ounce of croton seeds administered.

The female elephant—who was, if anything, in more violent pain than the male—was treated with an enema in the same way, and with the same beneficial result, the relief being most marked. The croton seeds had acted well at the time of my first visit next morning, the ground being covered with several cart-loads of feces. The animals are now as well as ever they were, and it was to see how they went on that I have delayed this report.

I examined the body of the male that died. The appearances were the usual ones of enteritis in equines, the intestines being intensely inflamed and impacted with hard masses of feces; and had the fire-engine been used the night before I am firmly convinced that this animal would have recovered; but, owing to the lateness of the hour I never thought of it, and even if I had there would have been delay in obtaining it or finding men to pump it. As I can find no record of such treatment being adopted with the elephant in any of the professional works that I now have access to, I venture to make the following remarks on the matter: 1. That a large quantity of water can be given, and the pumping continued for several

minutes, if necessary. 2. That the enema can be given to the animal standing, if he will not remain lying down, although the latter position is the more convenient for the operator; for in the standing position, from the overflow of water, he is liable to get very wet—at least, such was my experience; I was simply deluged, and had not a dry stitch of clothing on my back. 3. If the animal will not allow the nozzle to be inserted, there is no occasion to force it; for if held close to anus, and the pump worked hard, the force of the stream of water, if directed straight, is sufficient to fill the bowel. 4. The nozzles of the fire-engines, used by the military authorities in India, are long copper tubes, tapering towards one end, onto which is screwed a spout that generally has a flange with sharp edges. I would suggest that a spout of a special shape be authorized. This could be screwed onto the existing nozzle, and would be very little extra expense. I would furthermore suggest that some definite instruction be issued by the authorities, by which the use of the fire-engine could be obtained at these stations, and men to work it when necessary.—*From the Indian Lancet, March 16, 1896.*

BIRTH OF A LIVING FETUS ON THE TWO HUNDRED AND TWENTY-FIRST DAY OF GESTATION.

Veterinarian Capitaine was called to see a cow showing signs of labor and effected a delivery with artificial assistance. She was in a healthy condition.

The size of the new-born was proportional to its age; the hair, covering all parts of the skin, was extremely short; the hoofs were represented by a small friable mass; a rudimentary vulva and mammary glands indicated the sex. The young calf was unable to stand. It was fed artificially on milk, and at the end of fifteen days it was able to suckle its mother. At the present time shows no evidence of its premature birth.

This case may be instructive in performing artificial premature delivery.—*Rev. Vét.*

THE VALUE OF TETANUS ANTITOXIN.

Nocard (*Bulletin de l'Académie*, No. 42, 1895), after a discussion as to the nature and varieties of the toxin and the immunizing of animals against diphtheria and tetanus, holds

that diphtheria sero-theraphy is efficacious because it is begun in the very earliest stages of the disease, whilst in tetanus the entire organism is affected long before the remedy is applied. Experimentation has absolutely proved the protective value of injections, hence the desirability of employing these injections in cases of wounds which are likely to be followed by tetanus. It must be acknowledged that the curative treatment of this disease as yet remains to be proved. The preventive value of the serum cannot, however, be contested.

TUBERCLES OF GLANDERS.

M. Nocard's researches indicate the following conclusions :

1. Glanders can be easily transmitted by the digestive tract.

2. The translucid tubercle is a glanders lesion and constitutes the first stage in the evolution of the classical tubercle.

3. The translucid tubercle is much less rich in microbes than the opaque tubercle ; the microbes which it contains are rapidly destroyed by the cells.

These experiments have a great importance. They indicate :

1. The dangers resulting from soiling the food or the drinking water with the discharge of glanders.

2. Many observers who have not believed the translucid tubercle as a glanderous lesion have disputed the positive indications given by mallein.

3. Many obscure lesions of glanders not manifesting themselves by external clinical signs, but revealed only by mallein, may repair themselves, heal, and the thermic action produced by mallein may disappear.

The curability of glanders, affirmed by Nocard for some years, thus receives an explanation and experimental proof.—*Rev. Vet.*

ELONGATION OF THE HIND MEMBERS DUE TO CASTRATION.

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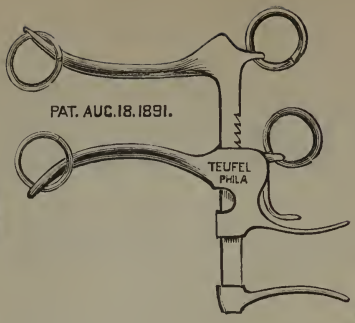

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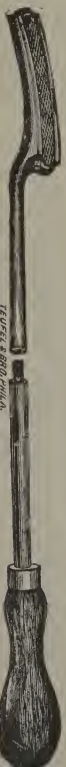

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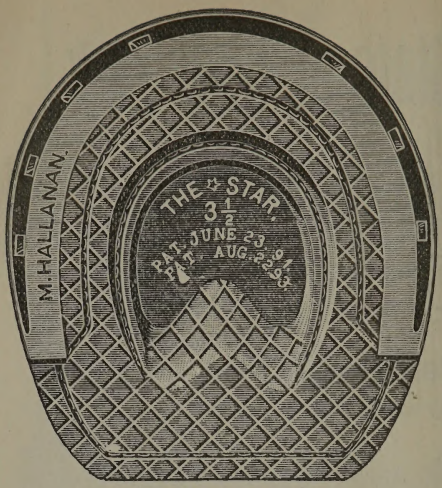

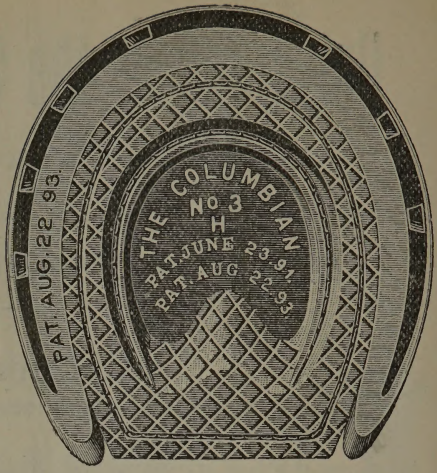

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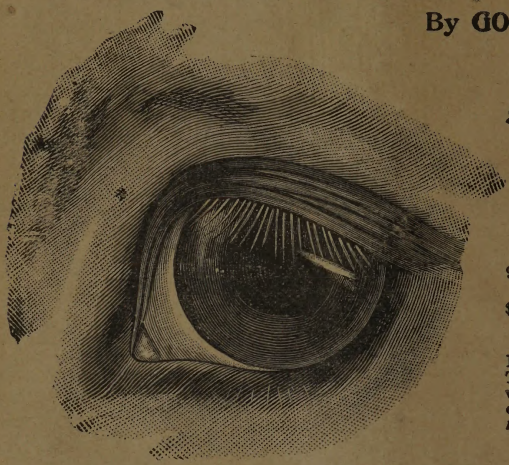

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